TELESTAR 97TA027 SM2

MODEL

SERVICE MANUAL

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TECHNICAL DATA

CRT PANEL	
Visible Picture	66 cm
Deflection Angle	110°
Vertical Frequency	50Hz
Horizontal Frequency	15.625Hz

ELECTRONIC

Program Number	60 + AV
Teletext	Flof Text
Tuner	Cable tuner - 8 MHz spacing for Hyper Band
TV System	European CCIR system
Music Power	2x8Watt Rms 10% distortion

CONNECTIONS

Euro AV Socket	Include

MAIN STAGE

Mains Voltage	165-260VAC
Mains Frequency	50Hz
Power Consumption	126W
In Stby Mode	15W

RECOMMENDATION FOR SERVICE REPAIRS

1- Use only original spare parts. Only use components with the same specifications for replacement.

2- Original fuse value only should be used.

3- Main leads and connecting leads should be checked for external damage before connection.

Check the insulation.

4- Parts contributing to the safety of the product must not be damaged or obviously unsuitable.

This is valid especially for insulators and insulating parts.

5- Thermally loaded solder pads are to be sucked off and re-soldered.

6- Ensure that the ventilation slots are not obstructed.

7- Potentials as high as 25 KV are present when this receiver is operating. Operation of the receiver outside the cabinet or with back cover removed involve a shock hazard from the receiver.

Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.

Perfectly discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken.

Glass fragments will be violently expelled.

Always discharge the picture tube anode to the receiver chassis to keep of the shock hazard before removing the anode cap.

8- Keep wire away from the high voltage or high temperature components.

9- When replacing a wattage resistor in circuit board, keep the resistor 10 mm away from circuit board.

HANDLING OF MOS CHIP COMPONENTS

MOS circuit requires special attention with regard to static charges. Static charges may occur with any highly insulating plastics and can be transferred to persons wearing clothes and shoes made of synthetic materials. Protective circuits on the inputs and outputs of mos circuits give protection to a limited extend only due to time of reaction.

Please observe the following instructions to protect the components against damage from static charges.

1- Keep mos components in conductive package until they are used. Most components must never be stored in styropor materials or plastic magazines.

2- Persons have to rid themselves of electrostatic charges by touching MOS components.

3- Hold the component by the body touching the terminals.

4- Use only grounded instruments for testing and processing purposes.

5- Remove or connect MOS ICs when operating voltage is disconnected.

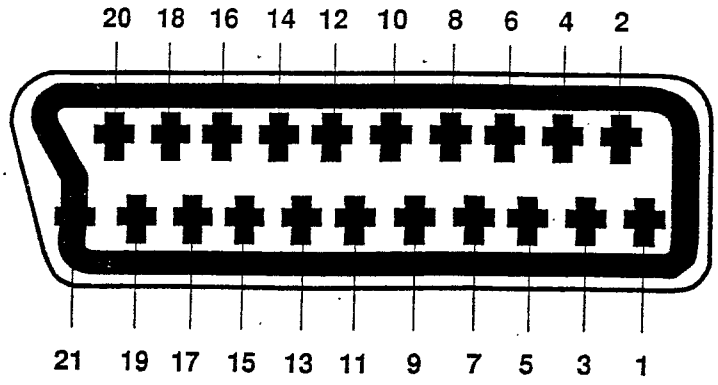
X-RAY RADIATION PRECAUTION

1- Excessive high voltage can be produce potentially hazardous X-RAY radiation. To avoid such hazard, the high voltage must not be above the specified limit. The nominal value of the high voltage of this receiver is 25KV at zero beam current (minimum brightness) under 220V AC power source. The high voltage must not under any circumstance, exceed 30KV. It is recommended the reading of the high voltage be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.

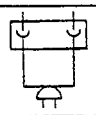
2- The primary source of X-RAY radiation in this TV receiver is the picture tube. For continued X-RAY radiation protection, the replacement tube must be exactly the same type tube as specified in the part list.

SPECIFICATIONS OF THE CONNECTOR (EURO SCART)

1- Audio output 1. right channel 0.5 VRMS/<1 k Ω
2- Audio input 1. right channel 0.5 VRMS (connected to No.6)
3- Audio output 2. left channel 0.5 VRMS (connected to No.1)
4- GND (audio)
5- GND
6- Audio input 2. left channel 0.5 VRMS/>10k Ω
7- RGB input, blue (B)
8- Switch signal video (status)
9- GND
10- Reserved for clock signals (not connected)
11- RGB input, green (G)
12- Reserved for remote control (not connected)
13- GND
14- GND switch signal RGB
15- RGB input, red (R)
16- Switch signal RGB
17- GND (video)
18- GND
19- Video output 1 Vpp/75 ohm
20- Video input 1 Vpp/75 ohm
21- Shield



COMPONENT DESCRIPTIONS

	POWER CORD
	SAW FILTER
	IR SENSOR
	VOLTAGE REGULATOR
	ON/OFF SWITCH
	LINE FILTER
	PTC
	NPN TRANSISTOR
	PNP TRANSISTOR
	CERAMIC FILTER
	COIL
	LINEARITY COIL
	FUSIBLE RESISTOR
	IW METAL OXIDE RESISTOR
	1/2W METAL OXIDE RESISTOR
	1/4 OR 1/6W CARBON FILM RESISTOR
	CERAMIC CAPACITOR /POLYESTER CAPACITOR
	ELECTROLYTIC CAPACITOR
	DIODE
	ZENER DIODE
	SWITCH JUMPER
	NET (INPUT)
	NET (OUTPUT)
	TACT SWITCH

SERVICE ADJUSTMENT AND ALIGNMENTS

HIGH VOLTAGE TEST

There is no high voltage adjustment component on the chassis. Changing of +145 depends on the supply voltage. If it's necessary to measure high voltage.

1- Connect the probe of high voltage tester to the anode of CPT.
2- Adjust contrast and brightness to minimum.
3- Measure the high voltage as 27 KV for 25" and 28" screen size.
4- For maximum brightness, high voltage regulation should be 2KV dc max.

AGC ADJUSTMENT

1- Apply Philips pattern signal which is 60 dB uV to the RF input.
2- Adjust P301 until find a picture without snowy.

VERTICAL ADJUSTMENT

1- Apply Philips pattern.
2- Adjust the vertical amplitude with P576 until the top and the bottom lines of the picture appear.
3- Center the picture with P579

HORIZONTAL ADJUSTMENT

1- Apply Philips pattern signal.
2- Center the picture horizontally by shifting to the left and right positions via P300.

ADJUSTMENT OF G2

1- Apply Philips test pattern
2- Adjust all the analog parameters to minimum with RC
3- Adjust G2 until the maximum cathode voltage is175V.

ADJUSTMENT OF SUPPLY VOLTAGE

1- Apply Philips pattern signal.
2- Set the volume, brightness and contrast values to minimum.
3- Adjust the supply voltage on the PIN cathode of D125 as Vsys = 145 + 0.5 by using P101.

FOCUS ADJUSTMENT

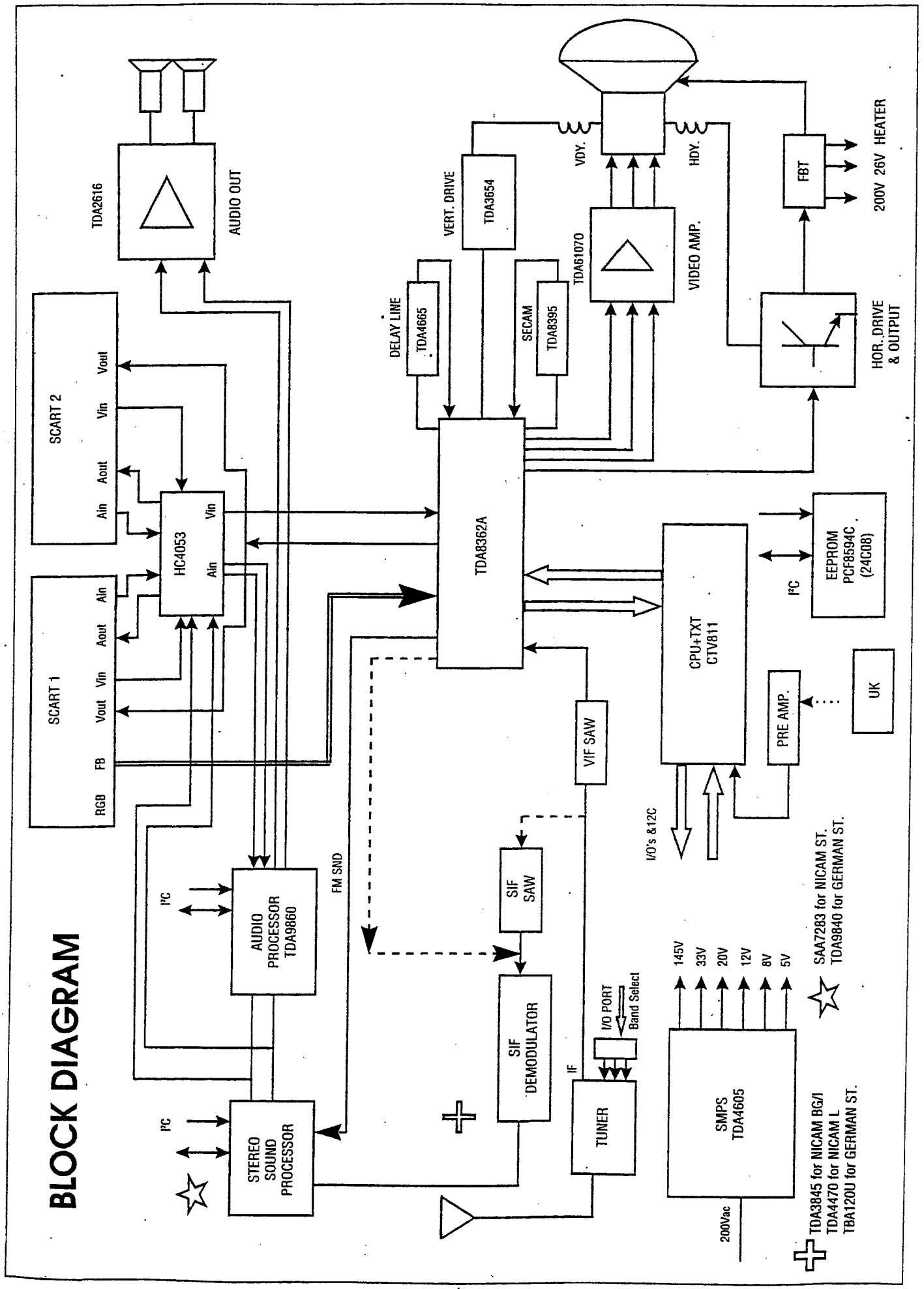
Adjust the thickness of lines until being minimum, by focus trimpot on the EHT transformer. By using crosshatch or multi-burst test pattern.

WHITE BALANCE ADJUSTMENT

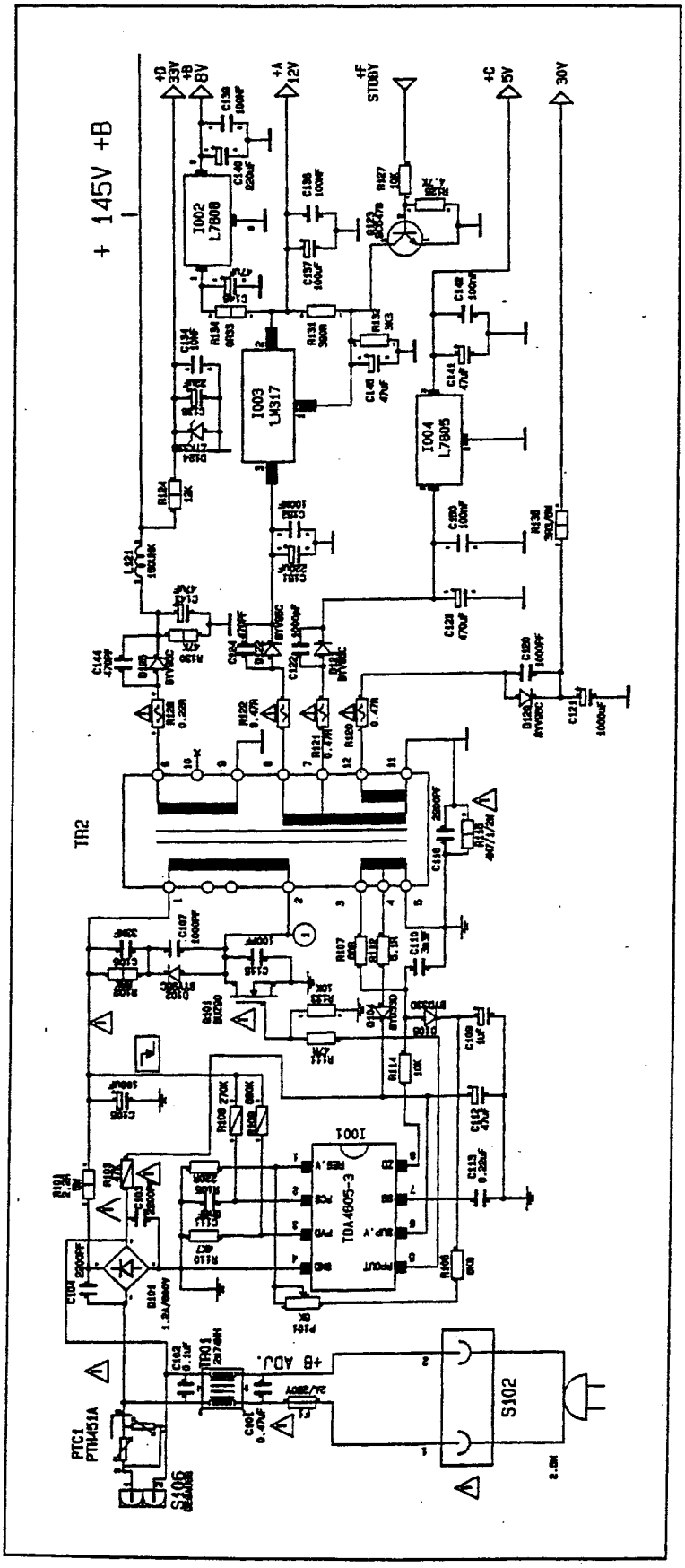
1- Apply Philips pattern.
2- Adjust G2
3- Adjust P001 and P002 of the CRT board to middle positic
4- Adjust contrast and Brightness to maximum level
5- Apply white pattern and place the probe of colour analyser to the screen.
6- Adjust P001 and P002 until X= 280 nits, y=300 nits.

AFC ADJUSTMENT

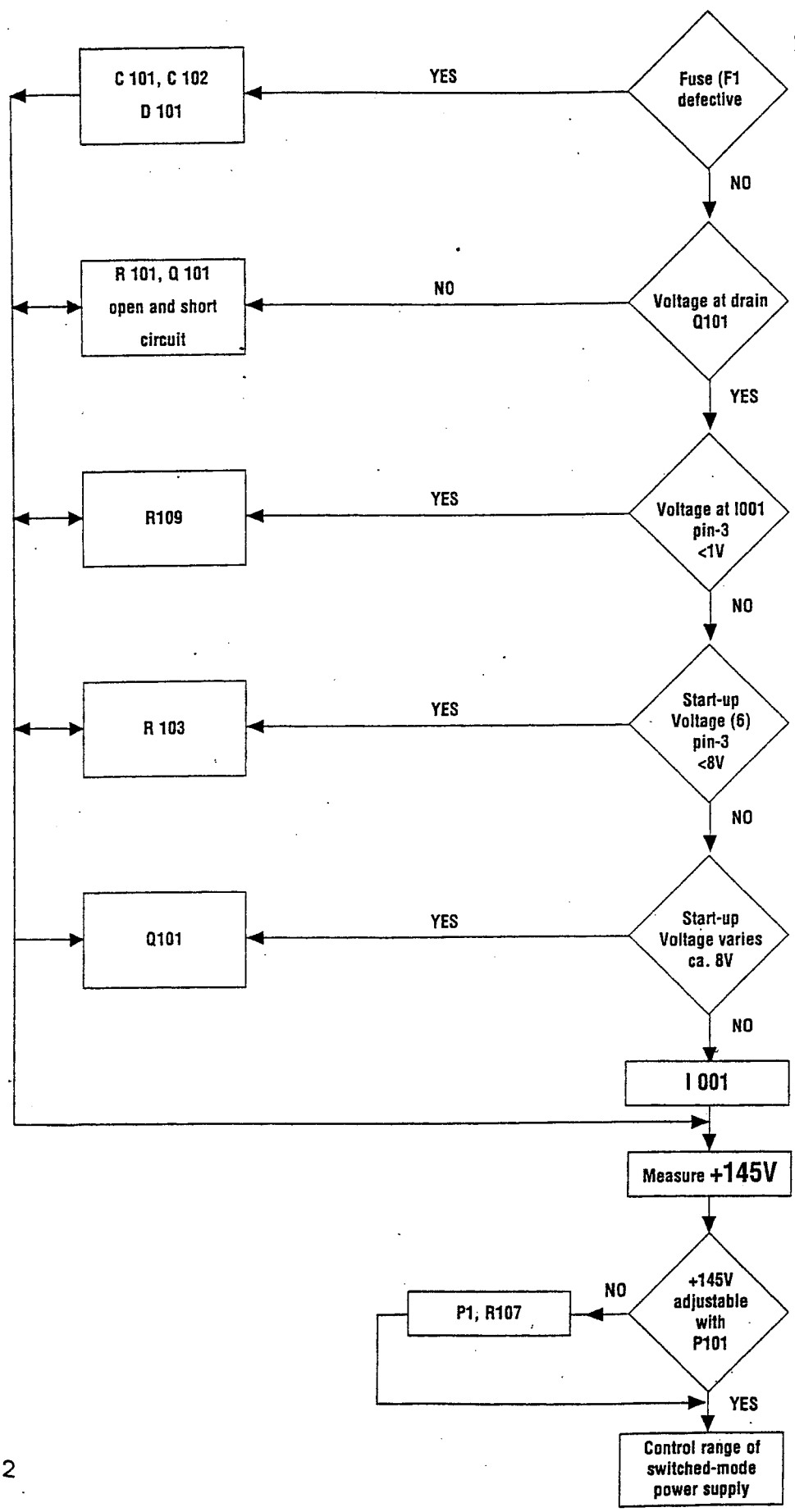
1- Place a balloon coil (300 Ohm dc resistance) parallel to L304
2- Apply 38.9 MHz signal (80dB µV) via balloon coil.
3- Connect a digital voltmeter to AFC pin (pin 9) of I301
4- Adjust T300 coil until the voltage of this pin is 2.5 Vdc (Pin 9 of I301)


BLOCK DIAGRAM
TDA2616
AUDIO OUT
SCART 2
Vout
Vin
Aout
Ain
SCART 1
Ain
Aout
Vin
Vout
FB
RGB
HC4053
Vin
Ain
DELAY LINE
TDA4665
VERT. DRIVE
TDA3654
SECAM
TDA8395
TDA8362A
TDA61070
VIDEO AMP.
VDY.
HDY.
FBT
200V 26V HEATER
HOR. DRIVE & OUTPUT
EEPROM PCF8594C (24C08)
I²C
CPU+TXT CTV811
PRE AMP.
UK
VIF SAW
I/O's &12C
SIF SAW
FM SND
AUDIO PROCESSOR TDA9860
I²C
SIF DEMODULATOR
I/O PORT
Band Select
IF
TUNER
STEREO SOUND PROCESSOR
I²C
145V
33V
20V
12V
8V
5V
SMPS TDA4605
200Vac
SAA7283 for NICAM ST.
TDA9840 for GERMAN ST.
TDA3845 for NICAM BG/I
TDA4470 for NICAM L
TBA120U for GERMAN ST.

POWER SUPPLY



FAULT TRACING DIAGRAM - POWER SUPPLY



Power Supply With TDA4605

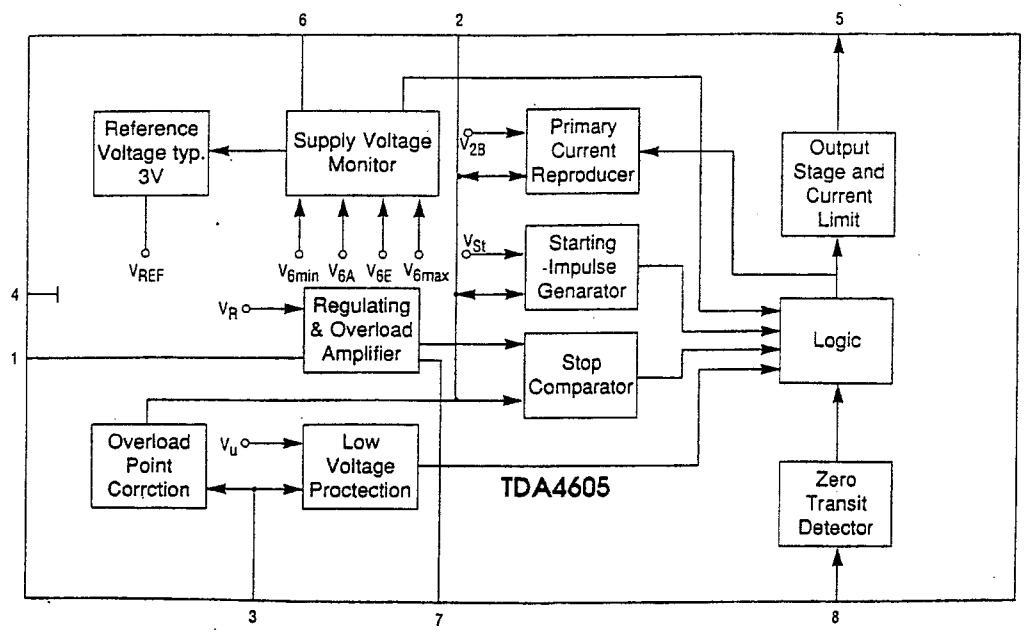
The IC TDA 4605 controls the MOS power transistor and performs all necessary regulation and monitoring functions in free running flyback converters.

FEATURES

- Overload protection
- Burst operation under short circuit conditions
- Loop error protection
- Switch-off if line voltage is too low
- Line voltage compensation of overload point
- Soft start for quite start up
- Chip over temperature protection
- On-chip parasitic transformer oscillation suppression circuit

TDA 4605-3

PINNING		PIN VOLTAGE	
		ST-BY	NORM.
1	Information Input Concerning Secondary Voltage	0.4V	0.4V
2	Information Input Regarding the Primary Current	1V	1.2V
3	Input for Primary Voltage Monitor	2.1V	2V
4	Ground	0V	0V
5	Output	0.8V	8V(10Vpp)
6	Supply voltage Input	12V	12.8V
7	Input for Soft-Start and Integrator Circuit	1.1V	1.9V
8	Input for the Feedback of the Oscillator	0.3V	0.4V



Pin Definitions and Functions

Pin No.	Function
1	**Information Input Concerning Secondary Voltage** By comparing the regulating voltage - obtained from the regulating winding of the transformer - with the internal reference voltage, the output impulse width on pin 5 is adjusted to the load of the secondary side (normal, overload, short-circuit, no load).
2	**Information Input Regarding the Primary Current** The primary current rise in the primary winding is simulated at pin 2 as a voltage rise by means of external RC-element. When a voltage level is reached thats derived from the regulating voltage at pin 1, the output impulse at pin 5 is terminated. The RC-element serves to set the maximum power at the overload point set.
3	**Input for Primary Voltage Monitoring** In the normal operation V3 is moving between the thresholds V3H and V3L (V3H > V3 > V3L)- V3 < V3L: SMPS is switched OFF (line voltage too low). V3 > V3H : Compensation of the overload point regulation (controlled by pin 2) starts at V3H : V3L = 1.7.
4	**Ground**
5	**Output** Push-pull output provides ±1 A for rapid charge and discharge of the gate capacitance of the power MOS-transistor.
6	**Supply Voltage Input** A stable internal reference voltage VREF is derived from the supply voltage also the switching thresholds V6A, V6E, V6 max and V6 min for the supply voltage detector. If V6 > V6E then VREF is switched on and switched off when V6 < V6A - In addition the logic is only enable for V6 min < V6 < V6 max-
7	**Input for Soft-Start** Start-up will begin with short pulses by connecting a capacitor from pin 7 to ground.
8	**Input for the Oscillation Feedback** After starting oscillation, every zero transition of the feedback voltage (falling edge) through zero (failing edge) triggers an output pulse at pin 5. The trigger threshold is at + 50 mV typical.

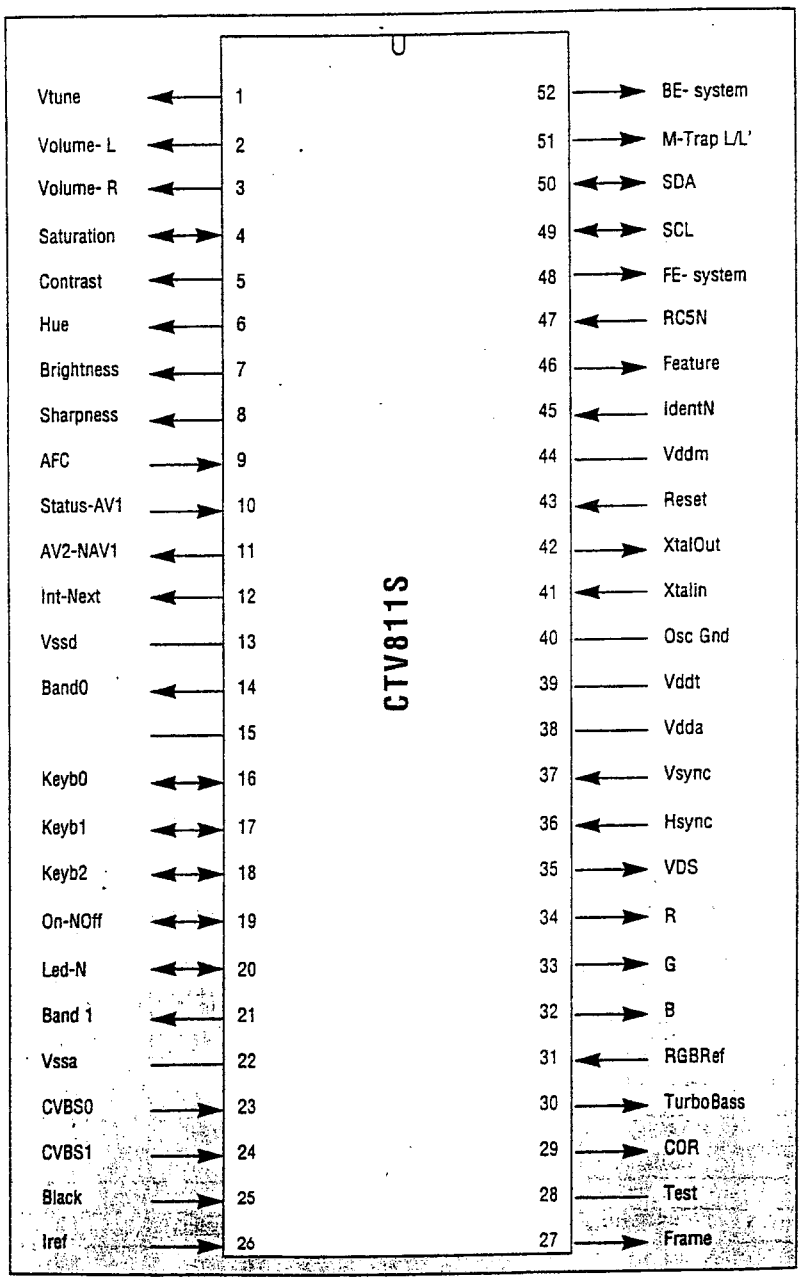
CTV811S (Microcontroller)

CTV811S is a low cost television receiver control system, based on the SAA5290/SAA5291 microcontroller. It is a Voltage Synthesis Tuning (VST) system with on-screen-display (OSD) of all relevant control functions. CTV811S supports a stereo sound system, based on a TDA9840 German Stereo decoder and a SAA7283 Nicam decoder. When the TV audio processor TDA9860 is present on the I2C-bus, it will control bass and treble. Instead, stereo sound volume can also be controlled by two on-chip DACs. Analoque picture settings are controlled by 6 on-chip digital-to-analogue converters.

CTV811S can two control SCART connections. Teletext is done by the CTV811S on-chip teletext interface.The user interface is menu-controlled for easy access with a reduced number of remote or local control keys.

The system supports automatic multi-system handling.

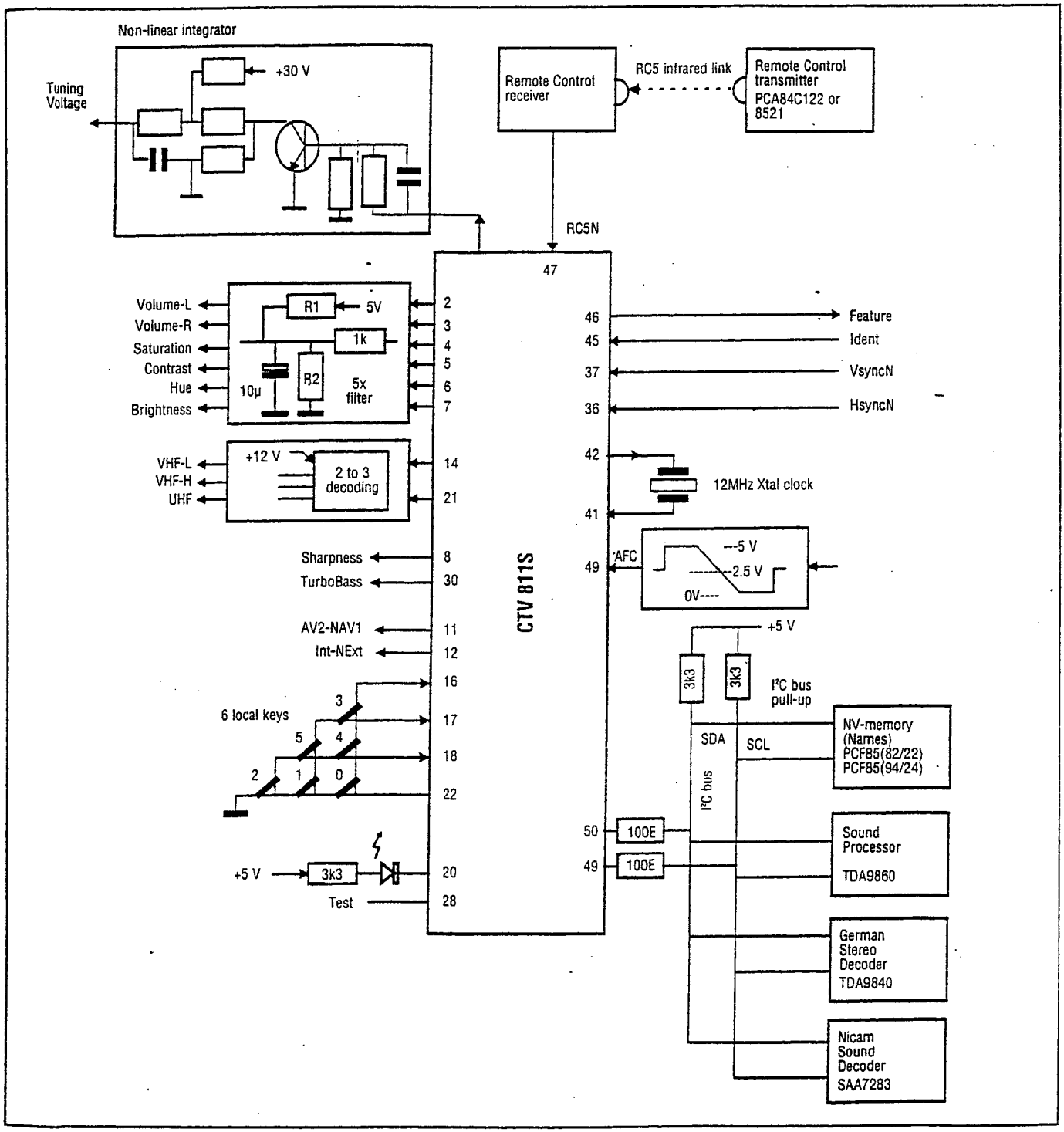
Microcontroller pin-layout of CTV811S



CTV811S (Microcontroller) Pin Description

CTV811S pins	Pin name	Signal name	I/O	Function
1	P2.0/TPWM	VTUNE	O	VST tuning PWM
2	P2.0/PWM0	VOL-L	O	Left channel sound volume
3	P2.0/PWM1	VOL-R	O	Right channel sound volume
4	P2.0/PWM2	SATURATION	I/O	Saturation PWM output & Colour-ID input
5	P2.0/PWM3	CONTRAST	O	Contrast PWM
6	P2.0/PWM4	HUE	O	Hue PWM
7	P2.0/PWM5	BRIGHTNESS	O	Brightness PWM
8	P2.7	SHARPNESS	O	Peaking: 0: Off, 1: Onf
9	P3.0/ADC0	AFC	I	Analogue AFC input
10	P3.1/ADC1	AV1 STATUS		1: Source Off, 0: Source Active
11	P3.20/ADC2	AV2-NAV1	O	Peripheral select
12	P3.3	INT-NEXT	O	
13	Vssd	-	-	Digital ground for teletext and microcontroller circuitry
14	P00	BAND0	O	Tuner band select
15	P0.1	-	-	Keyboard scan lines
16	P0.2	KEYB0	I/O	
17	P0.3	KEYB1	I/O	
18	P0.4	KEYB2	I/O	
19	P0.5	On-NOff	I/O	Power mode
20	P0.6	LEN-N	I/O	0: Led on, 1: Led off
21	P0.7	BAND1	O	Tuner band select
22	Vssa	Vssa	-	Analogue ground
23	CVBS0	CVBS0	I	CVBS from tuner
24	CVBS1	CVBS1	I	CVBS from scart
25	Black	Black	I	CVBS black level
26	IRef	IRef	I	Reference current for analogue circuits
27	Frame	Frame	O	For non-interlaced circuits
28	-	-	-	-
29	COR	COR	O	Contrast reduction
30	P3.4	TurboBass	O	Turbo Bass: 0: Off, 1: On
31	RGBRef	RGBRef	I	Drive (high) level for RGB outputs
32	B	B	O	Blue
33	G	G	O	Green
34	R	R	O	Red
35	VDS	VDS	O	Blanking
36	Hsync	Hsync	I	Horizontal synchronisation
37	Vsync	Vsync	I	Vertical synchronisation
38	Vdda	Vdda	-	Anologue supply voltage
39	Vddt	Vddt	-	Digital supply voltage for teletext
40	OscGND	OscGND	-	Oscillator ground
41	Xtalin	Xtalin	I	Oscillator input (12MHz)
42	Xtalout	Xtalout	O	Oscillator output
43	Reset	Reset		Reset
44	Vddm	Vddm		Digital supply voltage for microcontroller
45	P1.0/INT1	Ident	I	Horizontal Ident: 0: Fail, 1: OK
46	P1.1/T0	Feature	O	Feature: 0: Enabled, 1: Disabled
47	P1.2/INT0	RC5N	I	RC5 signal
48	P1.3/T1	FE-system	O	Front-end selection
49	P1.6/SCL	SCL	I/O	I²C Clock
50	P1.7/SDA	SDA	I/O	I²C Data
51	P1.4	M-Trap	O	M.trap or L/L'
52	P1.5	BE-System	O	Back-end selection

Block diagram



512x8 - bit static CMOS eeprom with I²C-bus interface PCF8594C (I302)

GENERAL DESCRIPTION

The PCF8594C is a 4-Kbit floating gate electrically erasable programmable read only memory (EEPROM). By using an internal redundant storage code it is fault tolerant to single bit errors. This feature dramatically increases reliability compared to conventional EEPROM memories.

Power consumption is low due to the full CMOS technology used. The programming voltage is generated on-chip,using a voltage multiplier.

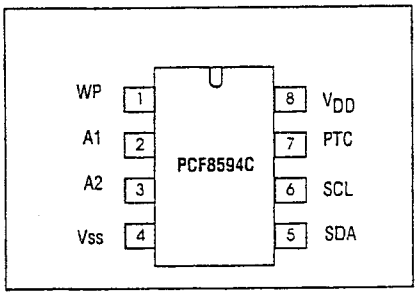
As data bytes are received and transmitted via the serial I2C-bus ,a package using eight pins is sufficient.

Timing of the ERASE/WRITE cycle is carried out internally , thus no external components are required. Pin 7 must be connected to either Vdd or left open-circuit. There is an option of using an external clock for timing the length of an ERASE/WRITE cycle.

A write- protection input at pin 1 allows disable of write-commands from the master by a hardware signal. When pin 1 is HIGH and one of the upper 256 EEPROM cells is adddressed then the data bytes will not be acknowledged by the PCF8594C and the EEPROM contents are not changed.

FEATURES

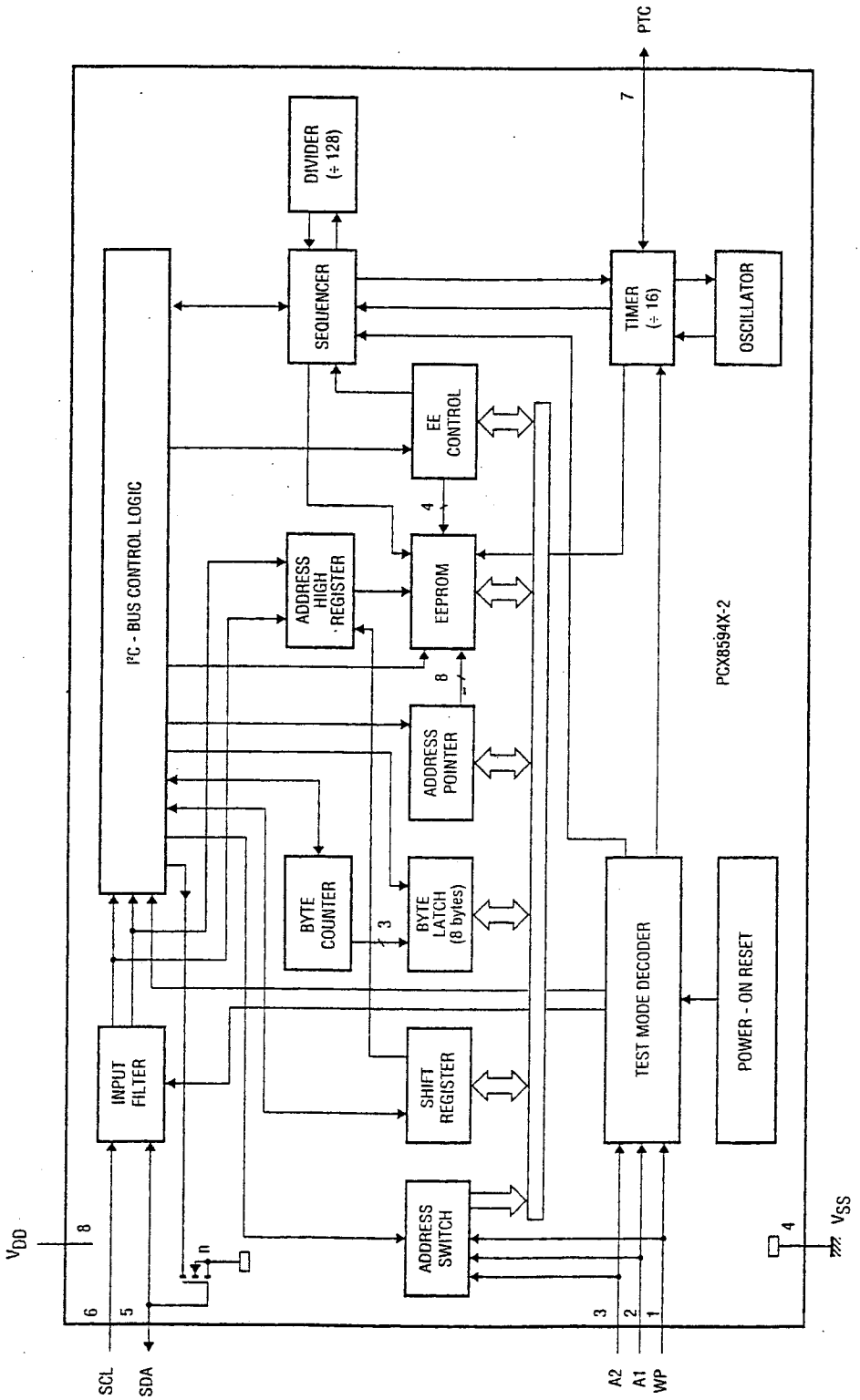
- Low power CMOS
  - maximum active current 2.5 mA
  - maximum standby current 10 µA (at 6.0 V), typical 4 µA
- Non-volatile storage of 4-Kbits organized as two pages of 256 x 8-bits each
- Single supply with full operation down to 2.5 V
- On-chip voltage multiplier
- Serial input/output I²C-bus
- Write operations
  - byte write mode
  - 8-byte page write mode
  - (minimizes total write time per byte)
- Write-protection input
- Read operations
  - sequential read
  - random read
- Internal timer for writing (no external components)
- Power-on reset
- High reliability by using a redundant storage code (single bit error correction)
- Endurance
  - >500 k E/W-cycles at Tamb = 22 °C
- 40 years non-volatile data retention time (typ.)



Pin configuration

PINNING

SYMBOL	PIN	DESCRIPTION
WP	1	write-protection input
At	2	address input1
A2	3	address input 2
Vss	4	negative supply voltage
SDA	5	serial data input/output (1²C-bus)
SCL	6	serial clock input (1²C-bus)
PTC	7	programming time central output
V_{DD}	8	positive supply voltage


PTC
7
DIVIDER (÷ 128)
SEQUENCER
TIMER (÷ 16)
OSCILLATOR
EE CONTROL
4
ADDRESS HIGH REGISTER
EEPROM
I²C - BUS CONTROL LOGIC
8
ADDRESS POINTER
PCX8594X-2
BYTE COUNTER
3
BYTE LATCH (8 bytes)
TEST MODE DECODER
POWER - ON RESET
INPUT FILTER
SHIFT REGISTER
ADDRESS SWITCH
V_{DD}
8
n
4
V_{SS}
6
5
3
2
1
SCL
SDA
A2
A1
WP

1024x8 - bit static CMOS EEPROM ST24C08 (I302)

DESCRIPTION

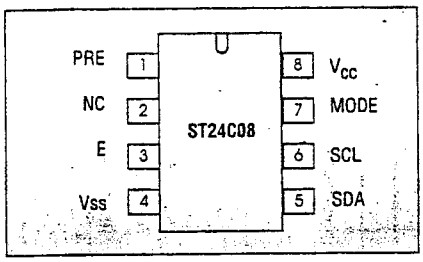
The ST24/25x08C are 8K bit electrically erasable programmable memories (EEPROM), organized as 4 blocks of 256 x 8 bits.

They are manufactured in Hi-Endurance Advanced CMOS technology which guarantees an endurance of more than one million erase/write cycles with a data retention of over 10 years.

The memories operate with a power supply value as low as 2.5V. Both Plastic Dual-in-Line and Plastic Small Outline packages are available

FEATURES

- MINIMUM 1 MILLION ERAS/WRITE CYCLES with OVER 10 YEARS DATA RETENTION
- SINGLE SUPPLY VOLTAGE:
  - 4.5V to 5.5V for ST24C08 version
- TWO WIRE SERIAL INTERFACE, FULLY I²C BUS COMPATIBLE
- BYTE and MULTIBYTE WRITE (up to 8 BYTES)
- PAGE WRITE (up to 16 BYTES)
- BYTE, RANDOM and SEQUENTIAL READ MODES
- SELF TIMED PROGRAMMING CYCLE
- AUTOMATIC ADDRESS INCREMENTING
- ENHANCED ESD/LATCH UP PERFORMANCES for "C" VERSIONS



Pin configuration

Signal Names

PRE	Write Protect Enable
E	Chip Enable Input
SDA	Serial Data Address Input/Output
SCL	Serial Clock
MODE	Multibyte/Page Write Mode
Vcc	Supply Voltage
Vss	Ground

Absolute Maximum Ratings

Symbol	Parameter			Value	Unit
TA	Ambient Operating Temperature		grade 1 grade 3 grade 6	0 to 70 -40 to 125 - 40 to 85	°C
T_{STG}	Storage Temperature			-65 to 150	°C
T_{LEAD}	Lead Temperature. Soldering	(S08 package) (PSDIP8 package)	40 sec 10 sec	215 260	°C
Vo	Output Voltage	ST24/25C08 ST24/25x08C		-0.3 to Vcc +0.6 -0.3 to 6.5	V
Vi	Input Voltage			-0.3 to 6.5	V
Vcc	Supply Voltage			-3 to 6.5	V
VESD	Electrostatic Discharge Voltage (Human Body model)(2)		ST24/25C08 ST24/25x08C	2000 4000	V
	Electrostatic Discharge Voltage (Machine model)(3)		ST24/25C06 ST24/25x06C	500 500	V

PINNING

PIN		PIN VOLTAGE
1	Audio deemphasis and +/- mod.switch Audio)	: 3V and 0.3Vrms (FM Audio)
2	IF-demodulator tuned circuit	: 6V
3	IF-demodulator tuned circuit	: 6V
4	Video identification output	: 5V
5	Sound IF plus volume control	: 0.5V - 4V
6	External audio input	: 4V
7	IF video output	: 2.5V and 2.0 Vpp (Video)
8	Decoupling digital supply	: 8V
9	AFC output	: -
10	Positive supply (8V)	: 8V
11	Ground	: -
12	Decoupling filter tuning	: 3.25V
13	Internal CVBS input	: 4.25V
14	Black-current input	: 4V
15	External CVBS input	: 3.5V
16	Chroma + A/V switch input	: 0V(TV)-8V (AV)
17	Brightness control input	: 1V - 3.5V
18	B-output	: 2.5V - 4Vpp
19	G-output	: 2.5V - 4Vpp
20	R-output	: 2.5V - 4Vpp
21	RGB-insertion and blanking	: 0V TV and 1.5V RGB mode
22	R-input for insertion	: 3.3V and 0.7 Vpp
23	G-input for insertion	: 3.3V and 0.7 Vpp
24	B-input for insertion	: 3.3V and 0.7 Vpp
25	Contrast control input	: 0V - 3V
26	Saturation control input	: 0V - 3V
27	Hue control input (or chroma out)	: 6V
28	B-Y input signal	: 4V
29	R-Y input signal	: 4V
30	R-Y output signal	: 1.5V
31	B-Y output signal	: 1.5V
32	4.43MHz output for TDA8395	: 1.6V(PAL) 4.5V(SEC)
33	Loop filter burst phase detector	: 4.5V
34	3.58 MHz X-tal connection	: 3V
35	4.43MHz X-tal connection	: 2V
36	Start horizontal oscillator	: 8V

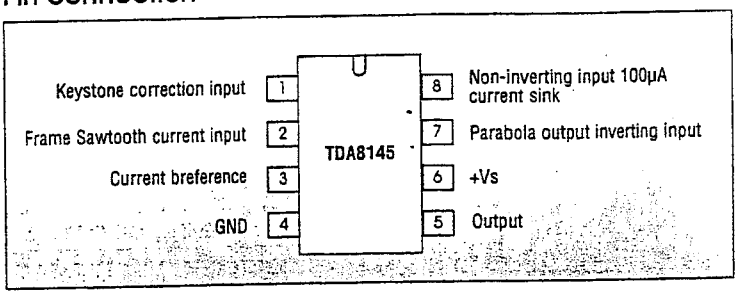
PIN		PIN VOLTAGE
37	Horizontal output	: 0.6Vp-p 15.6 KHz
38	Flyback input / sandcastle output	: 6Vpp
39	G2 loop filter	: 3V
40	G1 loop filter	: 3.75V
41	Ground	: 0V
42	Vertical feedback input	: 2.5V and 1 Vpp
43	Vertical ramp generator	: 2.5V and 1.5Vpp
44	Vertical output	: 2.5V
45	IF-input	: 4V
46	IF-input	: 4V
47	Tuner AGC output	: -
48	AGC decoupling capacitor	: 4V
49	Tuner take-over adjustment	: -
50	Audio output	: 3.4V
51	Decoupling sound demodulator	: 4.5V
52	Decoupling bandgap supply	: 6.5V

TV East / West Correction Circuit
TDA8145

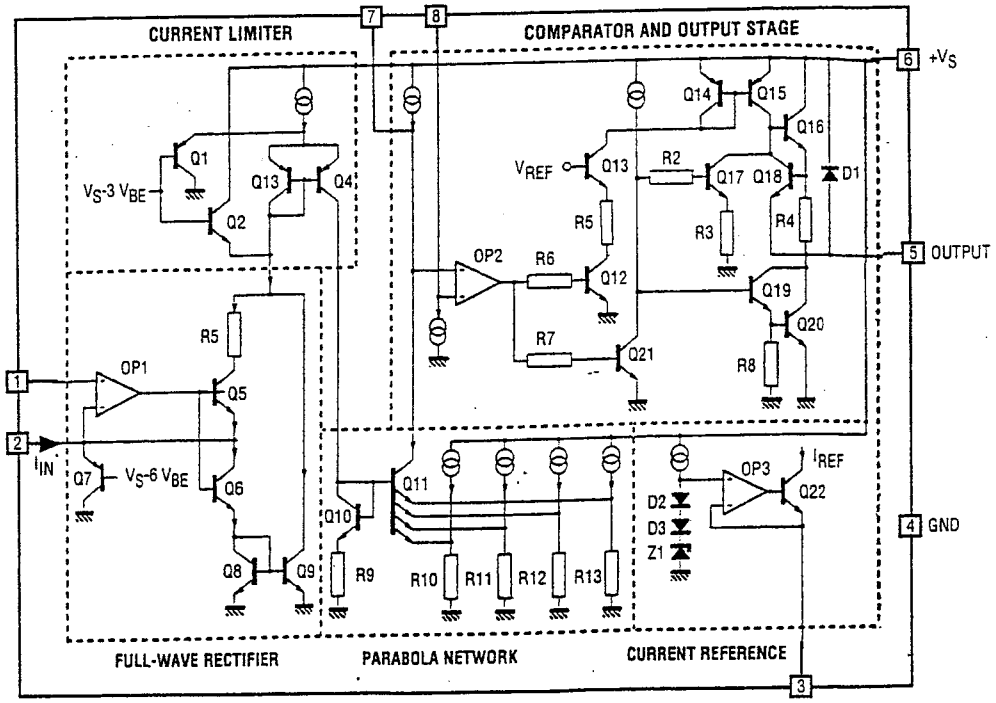
FEATURES

- LOW DISSIPATION
- SQUARE GENERATOR FOR PARABOLIC CURRENT SPECIALLY DESIGNED FOR SQUARE C.R.T. CORRECTION
- EXTERNAL KEYSTONE ADJUSTMENT (symmetry of the parabola)
- INPUT FOR DYNAMIC FIELD CORRECTION. (beam current change)
- STATIC PICTURE WIDTH ADJUSTMENT
- PULSE-WIDTH MODULATOR
- FINAL STAGE D-CLASS WITH ENERGY REDELIVERY
- PARASITIC PARABOLA SUPPRESSION, DURING FLYBACK TIME OF THE VERTICAL SAWTOOTH

Pin connection



SCHEMATIC DIAGRAM



TDA9830

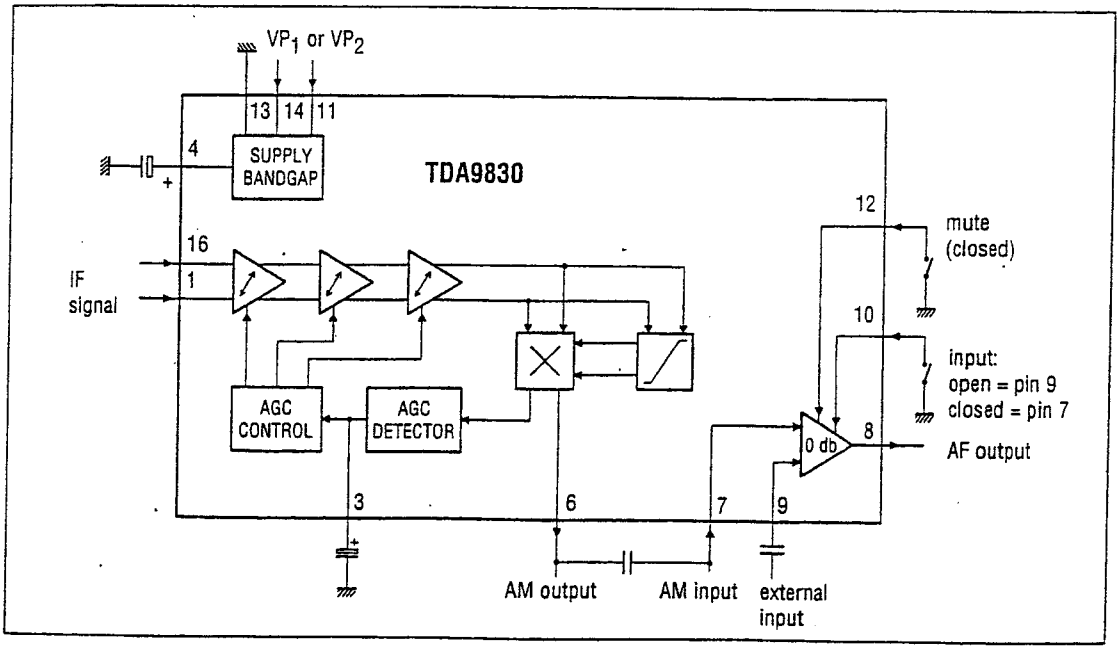
The TDA9830, is a monolithic integrated circuit, is designed for AM sound demodulation used in L and L' standard. The IC provides an audio source selector and also mute switch.

Features

- Adjustment free wideband synchronous AM demodulator
- Audio source mute switch
- Audio level according EN50049
- 5V to 8V power supply or 12V alternative
- Low power consumption

TDA 9830

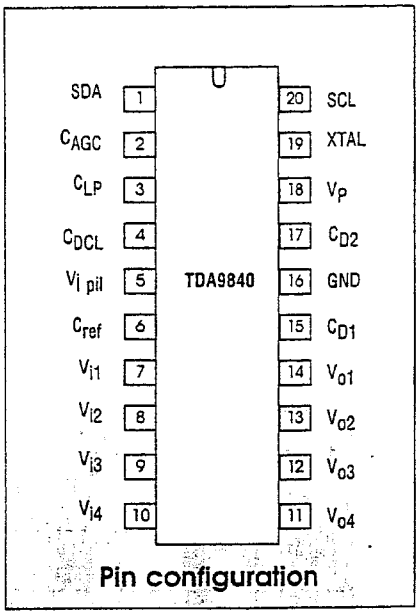
PINNING		PIN VOLTAGE
1	Sound IF differential input signal	:
2	Not connected	:
3	AGC capacitor	:
4	REF voltage filtering capacitor	:
5	Not connected	:
6	AM demodulator output	: 0.5Vpp
7	Input signal (from AM) to audio switch	: 0.5Vpp
8	Output signal from audio switch	: 0.5Vpp
9	Input signal (from external) to audio switch	: 0V (int) - 5V (ext)
10	Switch input select control	: 12V
11	Supply voltage +12V (alternative)	: -
12	Mute control	:
13	Ground (0V)	: 0V
14	Supply voltage +5 to +8V	:
15	Not connected	:
16	Sound IF differential input signal	:



Stereo/Dual Sound Processor with Digital Identification TDA9840

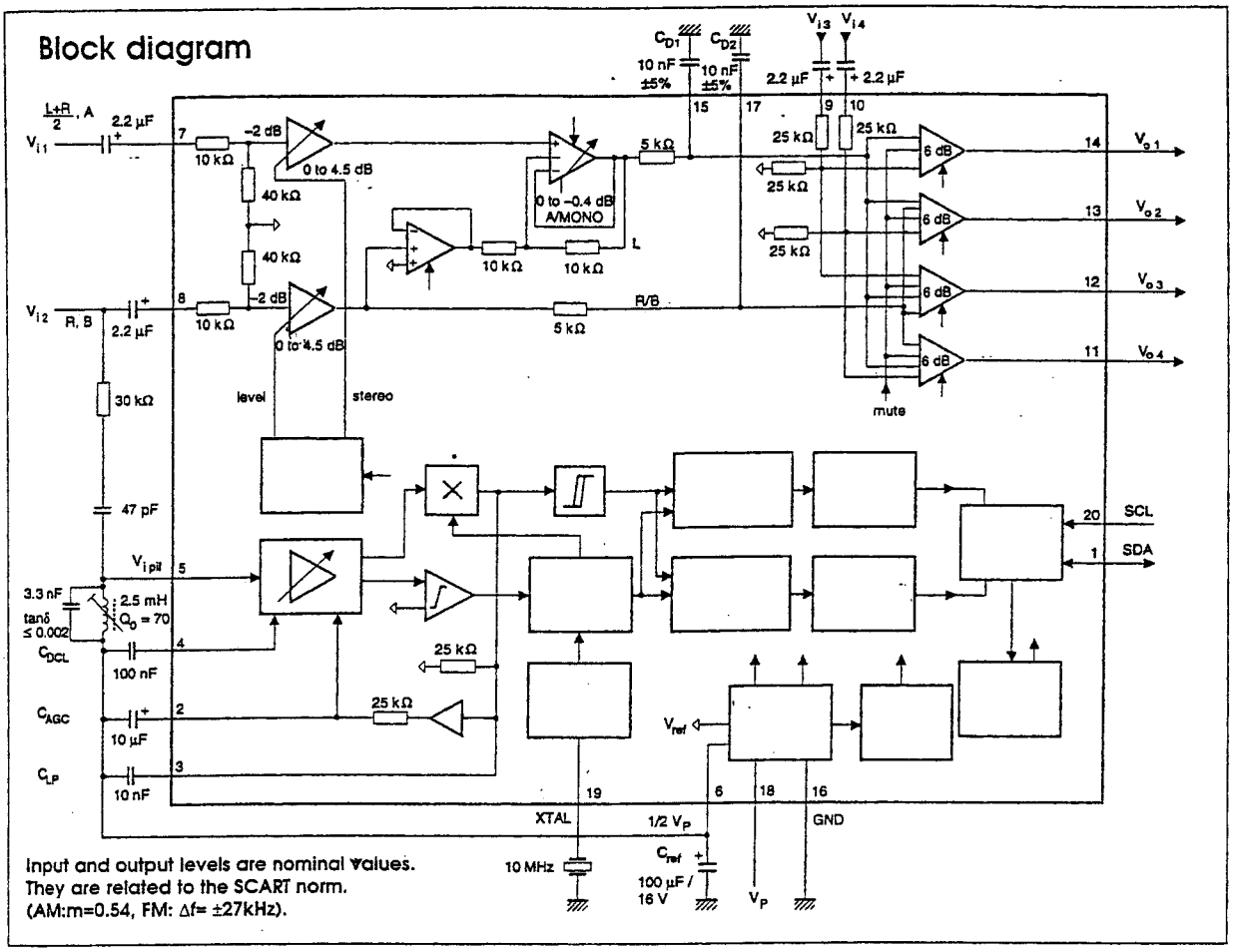
FEATURES

- Supply voltage 5 to 8 V.
- De - emphasis
- Source selector
- Level and stereo matrix adjustment possible via the I²C - bus
- I²C - bus transceiver
- AF inputs for NICAM or AM sound
- AF outputs for main and scart
- AF input and output signals selectable via the I²C - bus
- Information for identified transmission made is readable via I²C - bus
- Software is compatible with the TDA8415/25
- Quartz oscillator and clock generator
- Three digital integrators, alignment - free
- Two digital P_{LL}, alignment - free
- Stabilizer circuit for ripple rejection and constant output signals
- ESD protection of all pins.



Pin configuration

PINNING		
SYMBOL	PIN	DESCRIPTION
SDA	1	I2C-bus data input/output
C_{AGC}	2	AGC capacitor of pilot frequency amplifier
C_{LP}	3	Identification low-pass capacitor
C_{DCL}	4	DC loop capacitor
$V_{i\,pil}$	5	Pilot frequency input input voltage
C_{ref}	6	Capacitor of reference voltage (1/2 Vp)
V_{i1}	7	AF input signal Vi_1 (from 1st sound carrier)
V_{i2}	8	AF input signal Vi_2 (from 2nd sound carrier)
V_{i3}	9	AF input signal Vi_3 (NICAM or AM sound (standard L)
V_{i4}	10	AF input signal Vi_4 (NICAM)
V_{o4}	11	AF output signal Vo_4 (SCART)
V_{o3}	12	AF output signal Vo_3 (SCART)
V_{o2}	13	AF output signal Vo_2 (main)
V_{o1}	14	AF output signal Vo_1 (main)
C_{D1}	15	50 us de-emphasis capacitor of AF Channel 1
GND	16	Ground (0 V)
C_{D2}	17	50 µs de-emphasis capacitor of AF Channel 2
Vp	18	Supply voltage (+5 to +8V)
XTAL	19	10 MHz crystal input
SCL	20	I²C-bus clock input



FUNCTIONAL DESCRIPTION

The TDA9840 receives the signals from the FM - demodulators in a TV two sound - carrier system. The circuit is realized by the bipolar process.
The IC is intended for use in economic TV and VTR receivers. Therefore optimum relationship between integration of functions and use of external components has been striven for additionally a new type of identification circuit has been developed

AF signal handling

The input AF signals derived from the two sound carriers, are processed in analog form using operational amplifiers. The circuit incorporates Level - and stereo adjustment to correct the spreading in the FM detector output level.
De-emphasis is performed by two RC low - pass filter networks with internal resistors and external capacitors. This provides a frequency response with the tolarances given.
A source selector, controlled via I2C - bus allows selection of the different modes of operation in accordance with the transmitted signal. The device was designed for a nominal input signal (FM 54% modulation is equivalent)

IDENTIFICATION

The pilot signal is fed via an external RC hight - pass filter and single tuned LC band - pass filter to the input of a gain controlled amplifier. The external LC band - pass filter in combination with the external RC high - pass filter should have a loaded Q - factor of about 40 to 50 to ensure the highest identification sensitivity. By using a fixed coil to save the alignment, a Q factor of about 12 is proposed.

I²C-BUS TRANSCEIVER

The complete IC is controlled by a microcomputer via the I²C - bus. The built - in I²C - bus transceiver transmits the identification result to the I²C - bus receives the control data for the source selector and level control.

Power Supply

The different supply voltages and currents required for the analog and digital circuits are deceived from an internal band - gap reference circuit.

Power - on reset

When a power - on reset is activated by switching on the supply voltage or because of a supply voltage breakdown

Universal HI-FI audio processor for TV TDA9860

FEATURES

- Multi-source selector switches six AF inputs (three stereo sources or six mono sources)
- Each of the input signals can be switched to each of the outputs (crossbar switch)
- Outputs for loudspeaker channel, headphone channel and peri-TV connector (SCART)
- Switchable spatial stereo and pseudo stereo effects
- Audio surround decoder can be added externally
- Two general purpose logic output ports
- I²C-bus control of all functions.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
Vp	positive supply voltage (pin 6)	7.2	8.0	8.8	V
Ip	supply current	-	25	-	mA
Vi	input signal levels for 0 dB gain (RMS value)	2	-	-	V
Vo	output signal levels for 0 dB gain (RMS value)	2	-	-	V
Gv	gain in main channel				
	volume control (1 dB steps, balance included)	-63	-	+15	dB
	bass control (1.5 dB steps)	-12	-	+15	dB
	treble control(3 dB steps)	-12	-	+12	dB
	gain in headphone channel				
	volume control (2 dB steps)	-70	-	0	dB
	gain for muting in all channels	-80	-	-	dB
THD	total harmonic distortion	-	0.1	-	%
S/N	signal-to-noise ratio	-	85	-	dB
T_{amb}	operating ambient temperature	0	-	+70	°C

GENERAL DESCRIPTION

The TDA9860 provides control facilities for the main, the headphone and the SCART channel Of a TV set. Due to extended switching possibilities, signals from 3 stereo sources can be handled.

FUNCTIONAL DESCRIPTION

The TDA9860 consists of the following functions:

- Source select switching block
- Loudspeaker channel with effect controls
- Headphone channel
- Two port outputs for general purpose
- I²C-bus control

Source select switching block

The TDA9860 selects and switches the input signals from three stereo or six mono sources as there are MAIN, AUX and SCART to one of the outputs SCART, loudspeaker and headphone (crossbar-switching Table 3). Due to the fact, that the main channel (LINE outputs) is looped outside the circuit (from pins 9 and 24 to pins 10 and 23), signals can be used as LINE output or to insert a surround sound decoder.

Loudspeaker channel

Volume control is divided into the parts volume 1 and volume 2 / balance. The first part (55 dB) controls left and right channels simultaneously; the second part (23 dB) controls volume and balance of left and right channels independently. Treble control provides a control range from -12 to +12 dB and bass control from -12 to +15 dB. Extended bass control can be provided by an external T-network from -15 to +19 dB (2 dB steps).

Effect controls

'Linear stereo', stereo with spatial effect (30% or 52% anti-phase crosstalk)' and 'forced mono with or without pseudo-stereo effect' are controlled by three bits. A muting of 85dB is provided.

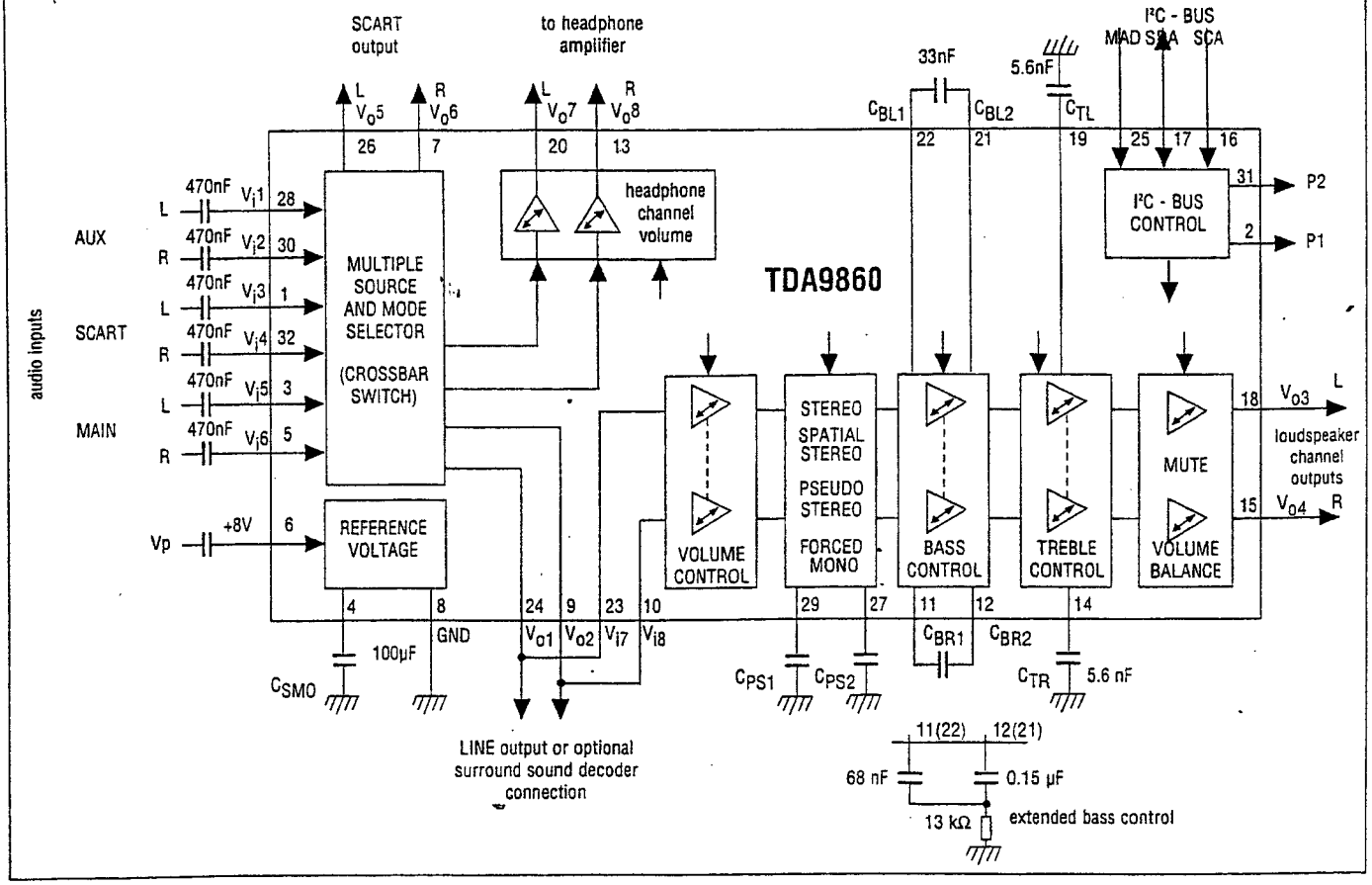
Headphone channel

The headphone channel is only equipped with volume / balance control. A muting of 85 dB is provided.

I²C-bus control

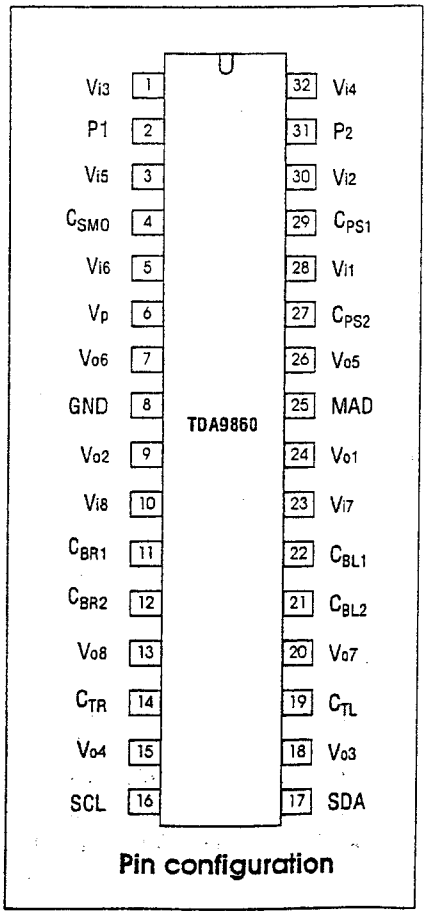
All settings of control are stored in subaddress registers. Data transmission is simplified by auto-incrementing the subaddresses. The on-chip power on reset sets the mute bit to active, so all 3 stereo outputs are muted.
The muting can be switched off by writing a '0' (non-muted) into the mute control bits.

Block diagram and application circuit



PINNING

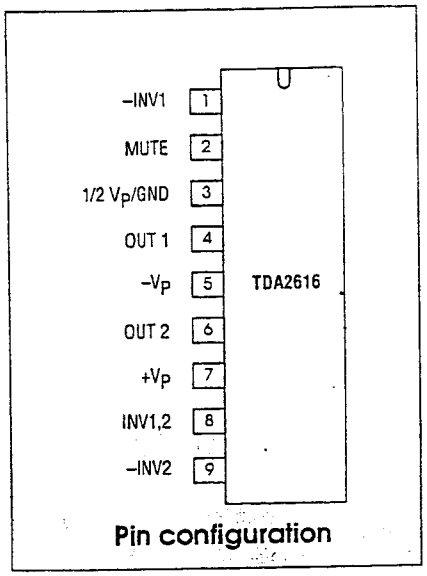
SYMBOL	PIN	DESCRIPTION
V_{i3}	1	Scart input signal LEFT
P1	2	Port 1 Output
V_{i5}	3	Main input signal LEFT
C_{SMO}	4	Smoothing capacitor of reference voltage
V_{i6}	5	Main input signal RIGHT
V_p	6	Positive supply voltage
V_{o6}	7	Scart output signal RIGHT
GND	8	Ground
V_{o2}	9	MAIN output signal RIGHT
V_{i8}	10	Input signal RIGHT to loudspeaker channel
C_{BR1}	11	Bass capacitor RIGHT 1
C_{BR2}	12	Bass capacitor RIGHT 2
V_{o8}	13	Headphone output signal RIGHT
C_{TR}	14	Treble capacitor RIGHT
V_{o4}	15	Loudspeaker channel output signal RIGHT
SCL	16	I²C-bus clock line
SDA	17	I²C-bus data line
V_{o3}	18	Loudspeaker channel output signal LEFT
C_{TL}	19	Treble capacitor LEFT
V_{o7}	20	Headphone output signal LEFT
C_{BL2}	21	Bass capacitor LEFT 1
C_{BL1}	22	Bass capacitor LEFT 2
V_{i7}	23	Input signal LEFT to loudspeaker channel
V_{o1}	24	MAIN output signal LEFT
MAD	25	Module address select input
V_{o5}	26	Scart output signal LEFT
C_{PS2}	27	Pseudo stereo capacitor 2
V_{i1}	28	AUX input signal LEFT
C_{PS1}	29	Pseudo stereo capacitor 1
V_{i2}	30	AUX input signal RIGHT
P_2	31	Port 2 output
V_{i4}	32	Scart input signal RIGHT



Pin configuration

Hi - Fi Power Amplifier
TDA2616

PINNING		
SYMBOL	PIN	DESCRIPTION
-INV1	1	non-inverting input 1
MUTE	2	mute input
1/2 V_P/GND	3	1/2 supply voltage or ground
OUT 1	4	output 1
$-V_P$	5	supply voltage (negative)
OUT 2	6	output 2
$+V_P$	7	supply voltage (positive)
INV1,2	8	inverting inputs 1 and 2
-INV2	9	non-inverting input 2



Pin configuration

QUICK REFERENCE DATA

Stereo application

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$\pm V_P$	Supply voltage range		7.5	–	21	V
P_o	Output power	V_P = ±16 V; THD = 0.5%	–	12	–	W
G_v	Internal voltage gain		–	30	–	dB
$\lvert G_{v1} \rvert$	Channel unbalance		–	0.2	–	dB
α	Channel separation		–	70	–	dB
SVRR	Supply voltage ripple rejection		–	60	–	dB
V_{no}	Noise output voltage		–	70	–	µV

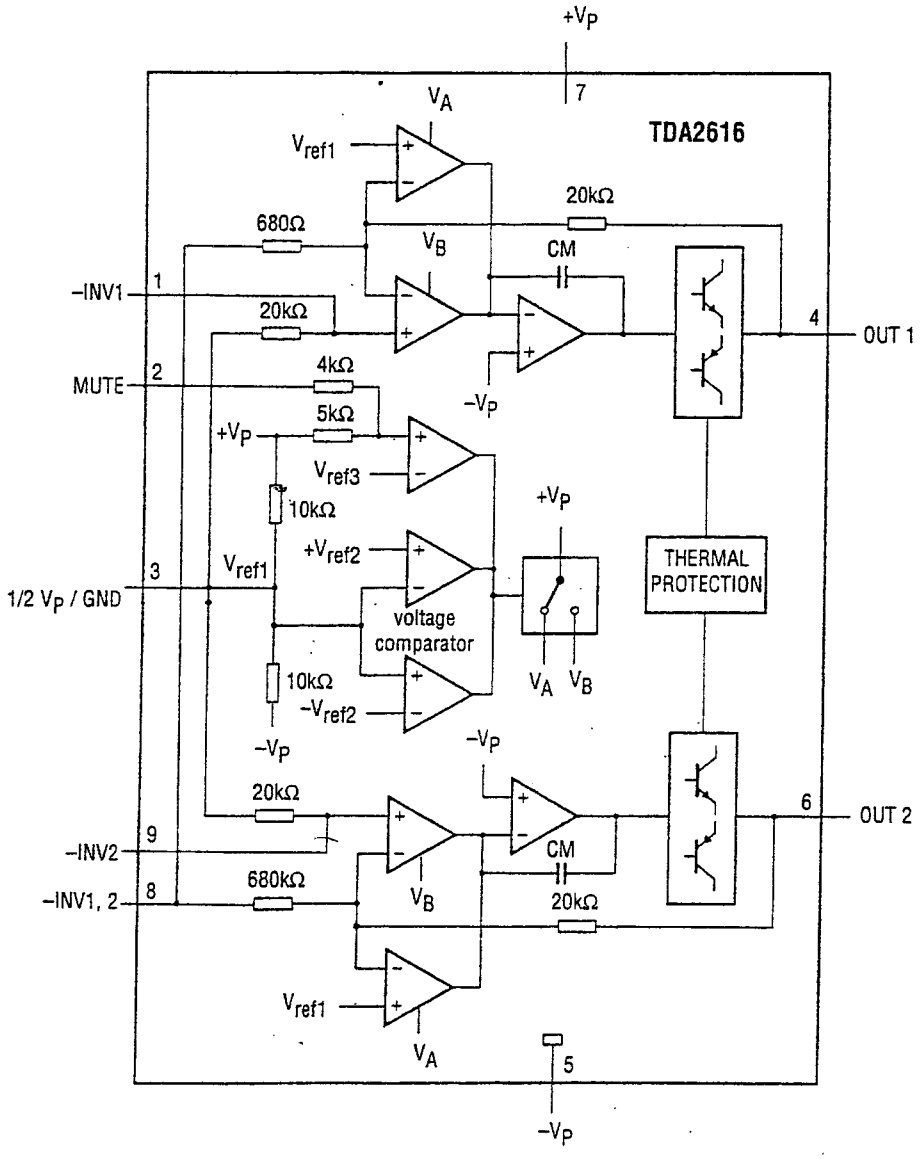
FUNCTIONAL DESCRIPTION

The TDA2616 is a HI - FI stereo amplifier designed for mains fed applications, such as stereo radio and TV. The circuit is optimally designed for symmetrical power supplies, but is also well-suited to asymmetrical power supply systems.

An output power of 2x12W can be delivered in to an 8 ohm load with a symmetrical power supply of ± 16V. The gain is internally fixed at 30db, thus offering a low gain spread and a very good gain balance between the two amplifiers (0.2db).

A special feature is the input mute circuit. This circuit disconnects the non - inverting inputs when the supply voltage drops below ± 6V, while the amplifier still retains its DC operating adjustment.

The device is provided with two thermal protection circuits. On circuit measures the average temperature of the crystal and the other measures the momentary temperature of the power transistors.



Block Diagram

Baseband Delay Line TDA4665

FEATURES

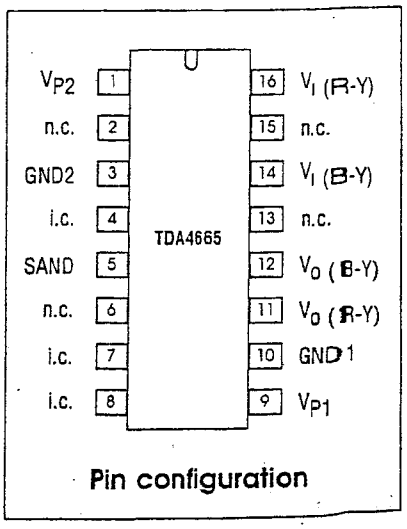
- Two comb filters, using the switched-capacitor technique, for one line delay time (64 µs)
- Adjustment-free application
- No crosstalk between SECAM colour carriers (diaphoty)
- Handles negative or positive colour-difference input signals
- Clamping of AC-coupled input signals (±(R-Y) and ±(B-Y))
- VCO without external components
- 3 MHz internal clock signal derived from a 6 MHz VCO, line-locked by the sandcastle pulse (64 µs line)
- Sample-and-hold circuits and low-pass filters to suppress the 3 MHz clock signal
- Addition of delayed and non-delayed output signals
- Output buffer amplifiers
- Comb filtering functions for NTSC colour-difference signals to suppress cross-colour

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_{P1}	analog supply voltage (pin 9)	4.5	5	6	V
V_{P2}	digital supply voltage (pin 1)	4.5	5	6	V
$I_{P\ tot}$	total supply current	-	5.9	7.0	mA
V_i	±(R-Y) input signal PAL/NTSC (peak-to-peak value, pin 16)	-	525	-	mV
	±(B-Y) input signal PAL/NTSC (peak-to-peak value, pin 14)	-	665	-	mV
	±(R-Y) input signal SECAM (peak-to-peak value, pin 16)	-	1.05	-	V
	±(B-Y) input signal SECAM (peak-to-peak value, pin 14)	-	1.33	-	V
G_V	gain V_O / V_i of colour-difference output signals				
	V_{11} / V_{16} for PAL and NTSC	5.3	5.8	6.3	dB
	V_{12} / V_{14} for PAL and NTSC	5.3	5.8	6.3	dB
	V_{11} / V_{16} for SECAM	-0.6	-0.1	+0.4	dB
	V_{12} / V_{14} for SECAM	-0.6	-0.1	+0.4	dB

PINNING

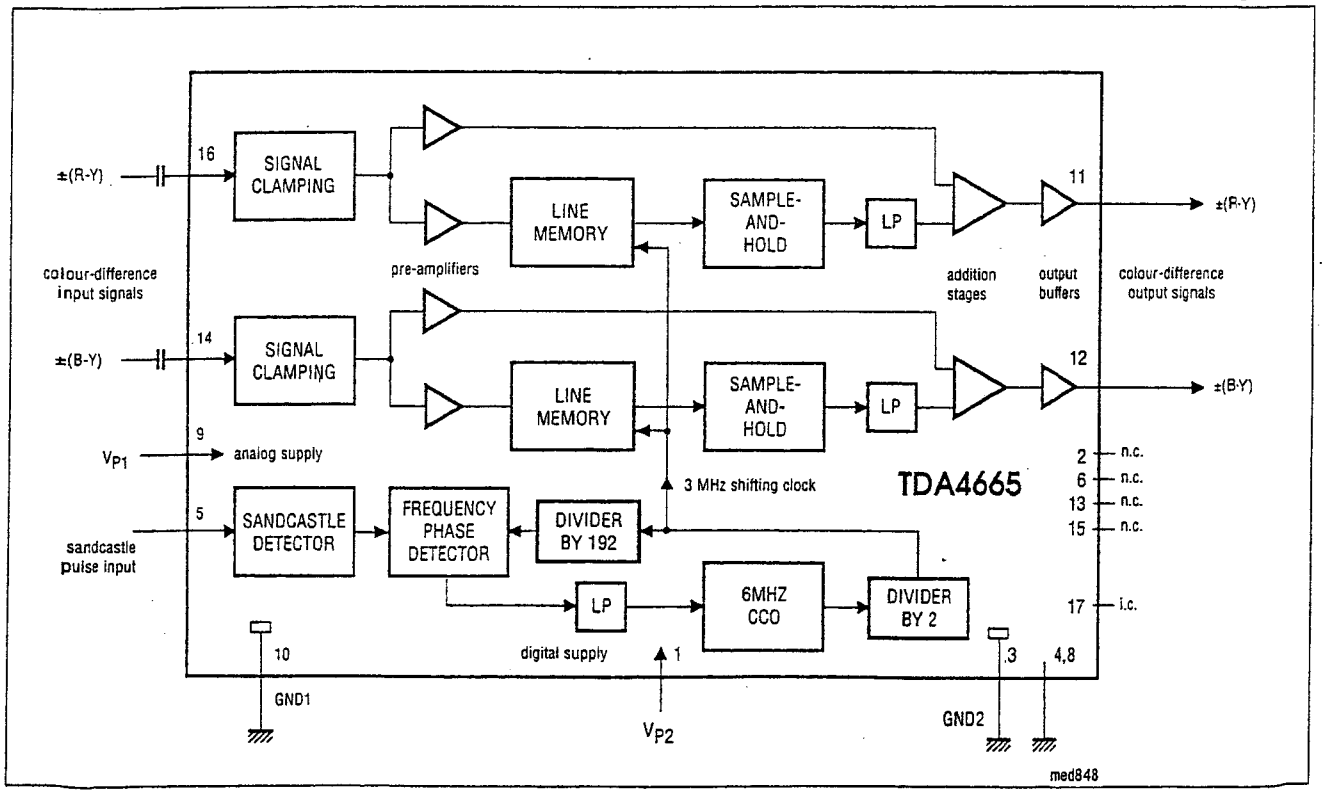
SYMBOL	PIN	DESCRIPTION
V_{P2}	1	+5 V supply voltage for digital part
n.c.	2	not connected
GND2	3	ground for digital part (0 V)
i.c.	4	internally connected
SAND	5	sandcastle pulse input
n.c.	6	not connected
i.c.	7	internally connected
i.c.	8	internally connected
V_{P1}	9	+5 V supply voltage for analog part
GND1	10	ground for analog part (0 V)
$V_{O\ (R-Y)}$	11	±(R-Y) output signal
$V_{O\ (B-Y)}$	12	±(B-Y) output signal
n.c.	13	not connected
$V_{i\ (B-Y)}$	14	±(B-Y) input signal
n.c.	15	not connected
$V_{i\ (R-Y)}$	16	±(R-Y) input signal



Pin configuration

PINNING		PIN VOLTAGE
1	Digital supply voltage	: 5V
2	Not connected	: -
3	Digital ground	: 0V
4	Test input	: 0V
5	Sandcastle input	: -
6	Not connected	: -
7	Test input	: -
8	Test input.	: -
9	Analog supply voltage	: 5V
10	Analog ground	: -
11	-(R-Y) output	:3.25V
12	-(B-Y) output	:3.25V
13	Reference current	: -
14	-(B-Y) input	:1.35V
15	Not connected	: -
16	-(R-Y) input	:1.35V

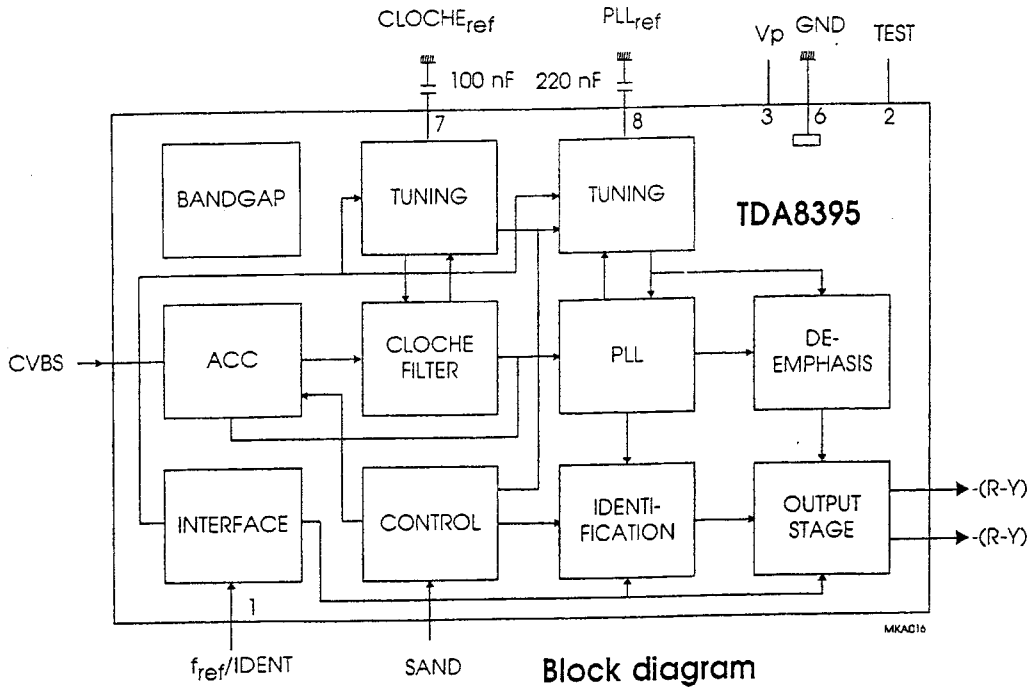
Block diagram



TDA8395

The TDA8395 is a self calibrating fully integrated SECAM decoder.

PINNING		PIN VOLTAGE
1	Reference frequency input	: -
2	Test output	: -
3	Positive supply voltage	: 8V
4	Not connected	: -
5	Not connected	: -
6	Ground	: 0V
7	Cloche reference filter	: -
8	PLL reference	: -
9	-(R-Y) output	: 1V
10	-(B-Y) output	: 1.3V
11	Not connected	-
12	Not connected	: -
13	Not connected	: -
14	Not connected	: -
15	Sandcastle pulse input	: 6Vpp
16	Video input	: -



Block diagram

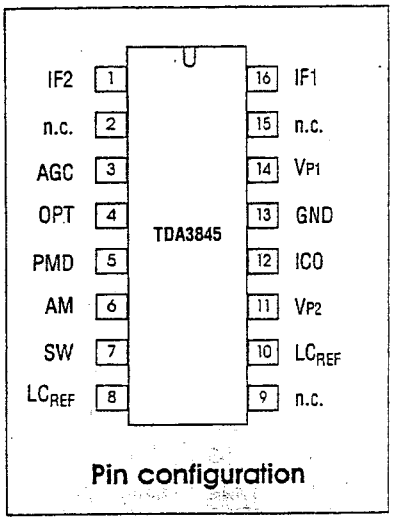
Quasi Split - Sound Circuit and AM Demodulator TDA3845

FEATURES

- Power supply from 5 V (200 mW) to 8 V source also an alternative 12V source (12 V not for TDA3845T)
- Gain controlled wideband IF amplifier (AG coupled with three stages)
- High precision internal 90° phase shifter for quadrature demodulator
- Amplitude detector for gain control which operates as a peak detector for FM sound and as a mean level detector for AM sound (switchable)
- In-phase wideband synchronous demodulator for AM detection
- Stabilizer circuit for ripple rejection and constant output signals
- ESD protection for all pins
- Suitable for all FM standards and L as well as L-accent standard
- NICAM compatible.

GENERAL DESCRIPTION

The TDA3845 is a quasi split-sound IF circuit which is designed to provide high performance television FM/AM sound.

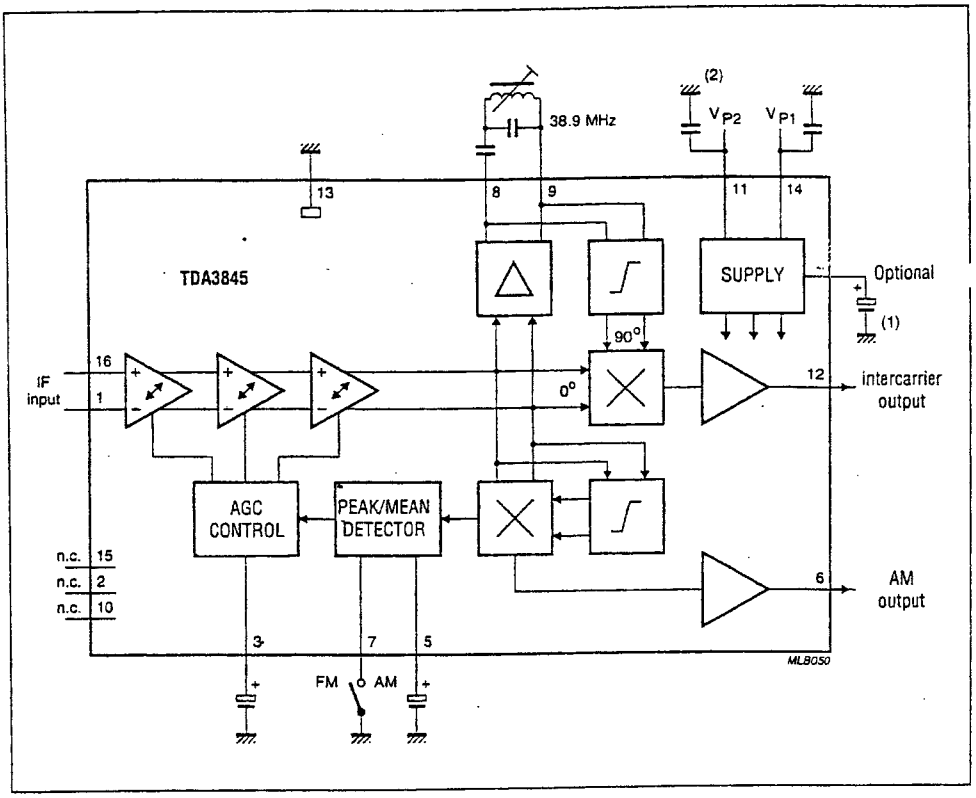


Pin configuration

SYMBOL	PIN	DESCRIPTION
IF2	1	IF amplifier input 2
n.c.	2	Not connected
AGC	3	AGC control capacitor
OPT	4	Optional capacitor (see note 10 to the characteristics)
PMD	5	Peak/mean detector capacitor
AM	6	AM output
SW	7	FM/AM switch
LC_{REF}	8	LC reference circuit for the picture carrier
n.c.	9	LC reference circuit for the picture carrier
LC_{REF}	10	Not connected
V_{P2}	11	Positive supply voltage 2 (+12V); note 1
ICO	12	Intercarrier output
GND	13	Ground (0V)
V_{P1}	14	Positive supply voltage 1 (+5V)
n.c.	15	Not connected
IF1	16	IF amplifier input 1

Note to Pinning: Not for TDA3845T, pin 11 not connected.

Block diagram



QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
	positive supply voltage				
V_{P1}	pin 14	4.5	5.0	8.8	V
V_{P2}	pin 11 (not for TDA3845T)	10.8	12.0	13.2	V
I_P	supply current	-	40	-	mA
$V_{1-16(RMS)}$	minimum IF input voltage (RMS value)	-	70	100	µV
	IF control range	60	63	-	dB
$V_{12-13(RMS)}$	intercarrier cutout voltage 5.5 MHz (RMS value)	70	100	-	mV
(S+W)/W	signal-to-weighted-noise ratio				
	(relative to 1 kHz; 50 kHz deviation)				
	at 5.5 MHz for 2T/20T	-	60	-	dB
	at 5.742 MHz ror 2n20T	-	58	-	dB
$V_{6-13(RMS)}$	AF output votage AM (RMS value)	440	550	660	mV
(S+W)/W	signal-to-weighted-noise ratio; AM mode	-	56	-	dB
THD	total harmonic distortion; AM mode	-	1	2	%
T_{amb}	operating ambient temperature	0	-	+70	°C

Terrestrial Digital Sound Decoder (TDSD3) SAA7283

The SAA7283 is a single chip NICAM receiver solution, developing the well established high quality Terrestrial Digital Sound decoder family from Philips Semiconductors .This innovative IC with analogue front enc. offers more impressive features and flexibility with minimum external circuitry.

FEATURES

* Single chip solution including FM and vision filters, analogue demodulator and audic switching.
* Dual standard with automatic selection between PAL system I and BGH.
* Single low-radiation crystal oscillator for improved EMC.
* Stereo bitstream audio DACs.
* Programmable attenuator for matching levels of NICAM and FM audio sources at the output of the device.
* Full EBU specification NICAM 728 demodulation and decoding.
* Digital Audio Interface conforming with EBU/IEC 958.
* Auto-mute function which switches from NICAM to FM sound when NICAM fails.
* Compatible with either single ended or differential DQPSK input signals.
* Microcomputer controllable via I^2C (up to 400 kHz specification)

APPLICATIONS

* Television Receivers.
* Video Cassette Recorders.

GENERAL DESCRIPTION

The SAA7283 takes, as input, a 2nd IF (intercarrier) Terrestrial TV PAL signal, and performs all the DOPSK demodulation, digital decoding and digital to analogue conversion necessary to produce a complete NICAM receiver on a single integrated circuit.

The demodulator function includes integrated beseband filters for pulse shaping and unwanted signal rejection, automatic gain control, a low jitter integrated VCO, digital monostables for precise data sampling points and a multi-standard controller to enable automatic locking to either a PAL system I or PAL system BGH input signal.

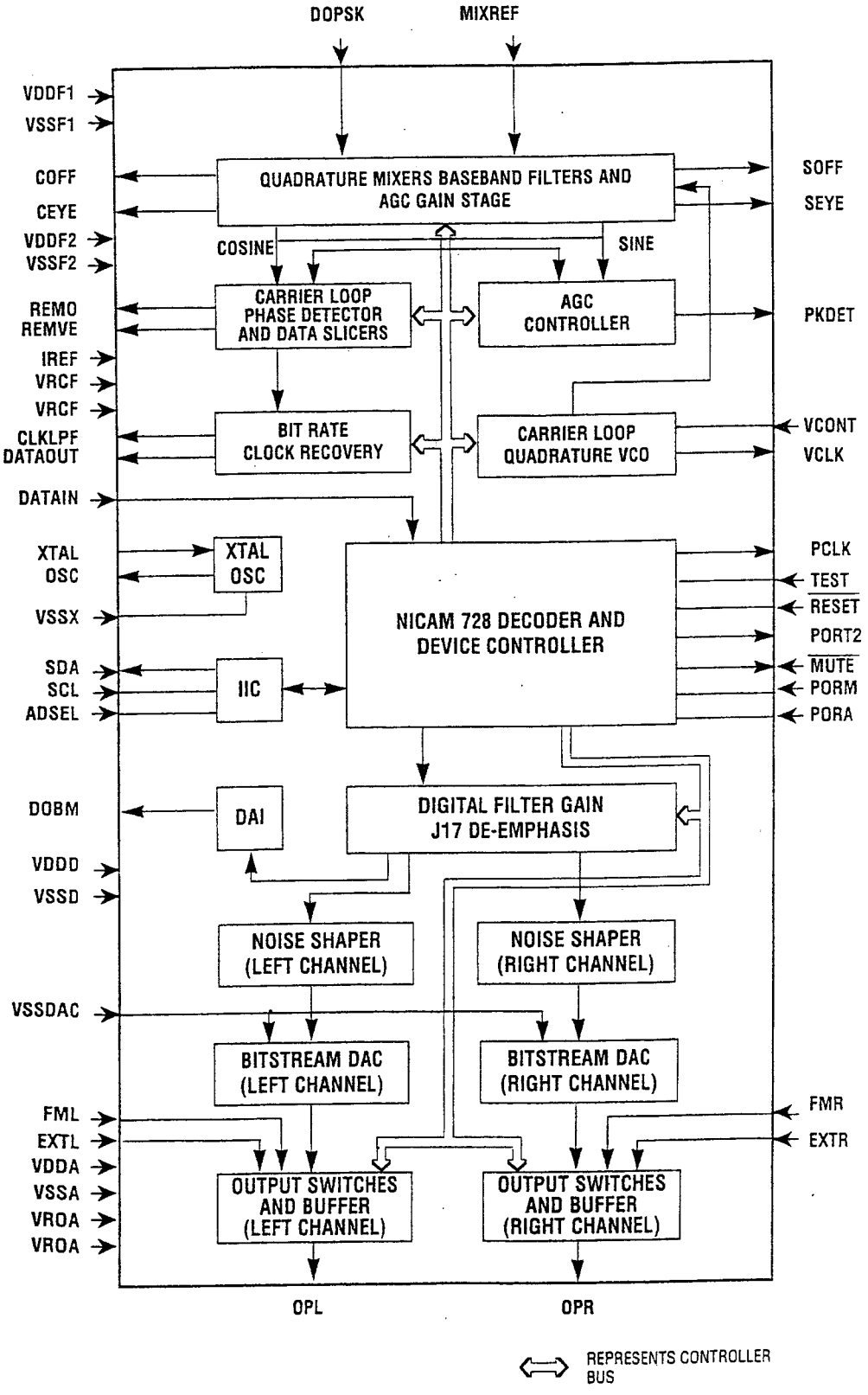
The decoder function performs the descrambling, de-interleaving and reformatting operations required to recover the original data words.

The data words are processed through a stereo digital filter, digital de-emphasis network, second order noise shaper and 256 times oversampling Bitstream audio DAC. The SAA7283 then provides a switching output buffer for selecting between FM, NICAM and daisy chain inputs, and a programmable level attenuation matrix for matching levels of the FM and NICAM audio sources at the output of the device. An additional feature is the inclusion of a Digital Audio interface output IEC958, which may be disabled if required.

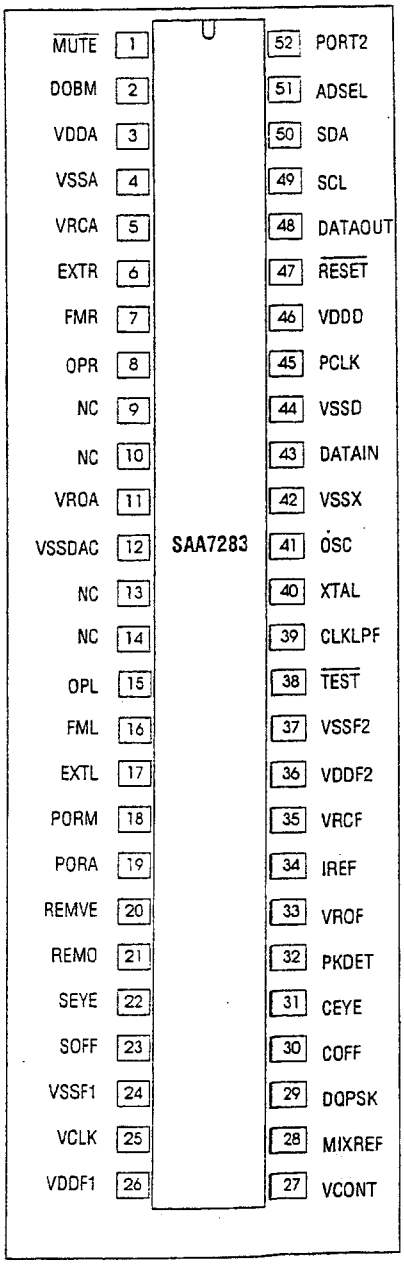
QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP	MAX.	UNIT
V_{DD}	supply voltage	4.5	5.0	5.5	V
I_{DD}	supply current	-	205	-	mA
fCLK	clock frequency	-	8.192	-	MHz
T_{amb}	operating ambient temperature range	-20	-25	-70	C

Block Diagram



TDSD3 IN SHDIL52 Pin Configuration



PINNING

SYMBOL	SOT319 OFP64	SOT247 SHDIL52	DESCRIPTION
NC	1, 5, 6, 9,10, 18, 19, 20, 26, 32, 33, 40, 51, 52, 58, 60, 64	9, 10, 13 14, 38	not connected - left open circuit in application.
EXTR	2	6	external analogue input to the night audio channel
FMR	3	7	FM sound input to the night audio channel
OPR	4	8	analogue output from the night audio channel
VROA	7	11	internal audio reference voltage buffer output
VSSDAC	8	12	guiet V_{SS} to DACs
OPL	11	15	analogue output from the left audio channel
FML	12	16	FM sound input to the left audio channel
EXTL	13	17	external analogue input to the left audio channel
PORM	14	18	active low Power-On Reset Mute. Mute cleared by setting slience bit high in I²C. (internal pull-up)
PORA	15	19	Power-On Reset Audio select. (internal pull-up)
REMVE	16	20	carrier loop filter connection
REMO	17	21	carrier loop filter output
SEYE	21	22	sine channel eye pattern output for monitoring
SOFF	22	23	sine channel offset compensator capacitor
VSSF1	23	24	demodulator V_{SS}
VCLK	24	25	carrier loop VCO clock output for monitoring
VDDF1	25	26	demodulator V_{DD}
VCONT	27	27	carrier loop VCO control voltage input
MIXREF	28	28	mixer voltage reference or input when using differential DQPSK signal
DQPSK	29	29	DQPSK input signal
COFF	30	30	cosine channel offset compensator capacitor
CEYE	31	31	cosine channel eye pattern output for monitoring
PKDET	34	32	AGC peak detector storage capacitor
VROF	35	33	internal demodulator reference voltage buffered output
IREF	36	34	internal demodulator reference current output
VRCF	37	35	internal demodulator reference voltage unbufiered output
VDDF2	36	36	demodulator V_{DD}
VSSF2	39	37	demodulator V_{SS}
CLKLPF	41	39	clock loop phase comparator output
XTAL	42	40	8.192 MHz crystal oscillator input
OSC	43	41	8.192 MHz crystal oscillator output

SYMBOL	SOT319 OFP64	SOT247 SHDIL52	DESCRIPTION
VSSx	44	42	crystal oscillator V_{SS}
DATAIN	45	43	serial data input at 726 kbits/s to decoder
DATAOUT	46	48	serial data output at 728 kbits/s from demodulator
POLK	47	45	output clock at 728 kHz to DQPSK demodulator
VSSD	48	44	digital V_{SS}
VDDD	49	46	digital V_{DD}
$\overline{\text{RESET}}$	50	47	active low power-on reset
SOL	53	49	clock input for I^2C
SDA	54	50	data input/output for I^2C
ADSEL	55	51	input that defines I^2C address bit 0 (internal pull-up)
PORT2	56	52	output that is directly controlled from port2 bit in I^2C
$\overline{\text{MUTE}}$	57	1	active low mute input whose function is defined by mutedeaf bit in I^2C
DOBM	59	2	digital audio interface output that can be tri-stated via I^2C
VDDA	61	3	audio V_{DD}
VSSA	62	4	audio V_{SS}
VRCA	63	5	internal audio reference voltage buffer (high impedance node)

TDA4470

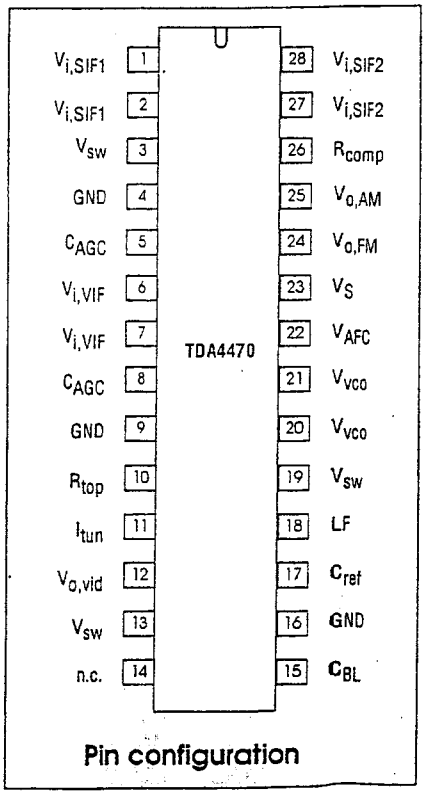
The TDA 4470 is an integrated bipolar circuit for multistandard video-sound IF (VIF/SIF) signal processing in TV/VCR and multimedia applications. The circuit processes all TV video IF signals with negative modulation (e.g. B/G standard), positive modulation (e.g. L standard) and the AM, FM/NICAM sound IF signals.

FEATURES

- 5V supply voltage; low power consumption
- Active carrier generation by FPLL principle (frequency-phase-locked-loop) for true synchronous demodulation
- Very linear video demodulation, good pulse response and excellent intermodulation figures
- VCO circuit is operating on picture carrier frequency
- Alignment-free AFC without external reference circuit, polarity of the AFC curve is switchable
- VIF-AGC for negative modulated signals (peak sync detection) and for positive modulation (peak white/black level detector)
- Tuner AGC with adjustable take over point
- Alignment-free quasi parallel sound (QPS) mixer for FM/NICAM sound IF signals
- Intercarrier output signal is gain controlled (necessary for digital sound processing)
- Complete alignment-free AM demodulator with gain controlled AF output
- Separate SIF-AGC with average detection
- Two independent SIF inputs
- Parallel operation of the AM demodulator and QPS mixer NICAM-L stereo sound
- Package and relevant pinning is compatible with the single standard version TDA4472; simplifies the design of an universal IF module

PINNING

SYMBOL	PIN	DESCRIPTION
$V_{i,SIF1}$	1	SIF1 input (symmetrical)
$V_{i,SIF1}$	2	SIF1 input (symmetrical)
V_{sw}	3	Input selector switch
GND	4	Ground
C_{AGC}	5	SIF-AGC (time constant)
$V_{i,VIF}$	6,7	VIF input (symmetrical)
C_{AGC}	8	VIF-AGC (time constant)
GND	9	Ground
R_{top}	10	Take over point, tuner AGC
I_{tun}	11	Tuner AGC output current
$V_{o,vid}$	12	Video output
V_{sw}	13	Standard switch
n.c.	14	not connected
G_{bl}	15	Black level capacitor
GND	16	Ground
C_{ref}	17	Internal reference voltage
LF	18	Loop filter
V_{sw}	19	AFC switch
V_{vco}	20,21	VCO circuit
V_{AFC}	22	AFC output
V_s	23	Supply voltage
$V_{o,FM}$	24	Intercarrier output
$V_{o,AM}$	25	Af output - AM sound
R_{comp}	26	Offset compensation
$V_{i,SIF2}$	27,28	BIF2 input (symmetrical)



Pin configuration

CIRCUIT DESCRIPTION

Vision IF amplifier

The video IF signal (VIF) is fed through a SAW filter to the differential input (pin 6-7) of the VIF amplifier. This amplifier consists of three AC-coupled amplifier stages. Each differential amplifier is gain controlled by the automatic gain control (VIF-AGC). Output signal of the VIF amplifier is applied to the FPLL carrier generation and the video demodulator.

Tuner-and VIF-AGC

At pin 8 the VIF-AGC capacitor to generate a control voltage for setting gain of VIF amplifier and tuner in order to keep the video output signal at a constant level. Therefore in case of negative modulated signals (e.g. B/G standard) the sync level of the demodulated video signal is the criterion for a fast charge/discharge of the AGC capacitor. For positive modulation (e.g. L standard) the peak white level of video signal controls the charge current. In order to reduce reaction time for positive modulation, where a very large time constant is needed, an additional black level detector controls the discharge current in the event of decreasing VIF input signal. The control voltage (AGC voltage at pin 8) is transferred to an internal control signal, and is fed to the tuner AGC to generate the tuner AGC current at pin 11 (open collector output). Take over point of the tuner AGC can be adjusted at pin 10 by a potentiometer or an external DC voltage (from interface circuit or microprocessor).

FPLL, VCO and AFC

The FPLL circuit (frequency phase locked loop) consists of a frequency and phase detector to generate control voltage for the VCO tuning. In the locked mode the VCO is controlled by the phase detector and in unlocked mode the frequency detector is superimposed. The VCO operates with an external resonance circuit (L and C parallel) and is controlled by internal varicaps. The VCO control voltage is also converted to a current and represents the AFC output signal at pin 22. With the AFC output signal at pin 22. With the AFC switch (pin 9) three operating conditions of the AFC are possible: AFC curve "rising" or "falling" and AFC "off".

A practicable VCO alignment of the external coil is the adjustment to zero AFC output current at pin 22. At centre frequency the AFC output current is equal to zero. The optional potentiometer at pin 26 allows an offset compensation of the VCO phase for improved sound quality (fine adjustment). Without a potentiometer (open circuit at pin 26) this offset compensation is not active.

The oscillator signal passes a phase shifter and supplies the in-phase signal (0°) of the generated picture carrier.

Video demodulation and amplifier

The video IF signal, which is applied from the gain controlled IF amplifier, is multiplied with the inphase component of the VCO signal. The video demodulator is designed for low distortion and large bandwidth. The demodulator output signal passes an integrated low pass filter for attenuation of the residual visual carrier and is fed to the video amplifier. The video amplifier is realised by an operational amplifier with internal feedback and 8 MHz bandwidth (,3dB). A standard dependent DC level shift in this stage delivers the same sync level for positive and negative modulation. An additional noise clipping is provided. The video signal is fed to VIF-AGC and to the video output buffer. This amplifier with 6dB gain offers easy adaption of the sound trap. For nominal video IF modulation the video output signal at pin 12 is $2V_{pp}$.

Sound IF amplifier and SIF-AGC

The SIF amplifier is nearly identical with the 3-stage VIF amplifier. Merely the first amplifier stage exists twice and is switchable by a control voltage at pin 3. Therefore with a minimal external expense it is possible to switch between two different SAW filters. Both SIF inputs features excellent cross-talk attenuation and an input impedance which is independent from the switching condition.

The SIF-AGC is related to the average level of AM- or FM-carrier and controls the SIF amplifier to provide a constant SIF signal to the AM demodulator and QPS mixer.

AM demodulator

The alignment-free AM demodulator is realised by a synchronous detector. The modulated SIF signal from the SIF amplifier output is multipled in phase with the limited SIF signal

(AM is removed). The AF signal of the demodulator output is fed to the output amplifier and to the SIF-AGC. For all TV standards with negative video modulation (e.g. B/G standard) the AF output signal (pin 25) is switched off by the standard switch.

Quasi-Parallel-Sound (QPS) mixer

The QPS mixer is realised by a multiplier. The SIF signal (FM or NICAM carrier) is converted to the intercarrier frequency by the regenerated picture carrier (quadrature signal) which is provided from the VCO. The intercarrier signal is fed via an output amplifier to pin 24.

Standard switch

To have equal polarity of the video output signal the polarity can be switched in the demodulation stage in accordance with the TV standard. Additional a standard dependent DC level shift in the video amplifier delievers the same sync level. Parallel the correct VIF-AGC is selected for positive modulated VIF signals. In case of negative modulation (e.g.B/G standard) the AM output signal is switched off. For positive modulation (L standard) the AM demodulator and QPS mixer is active. This condition allows a parallel operation of the AM sound signal and the NICAM-L stereo sound.

AFC switch

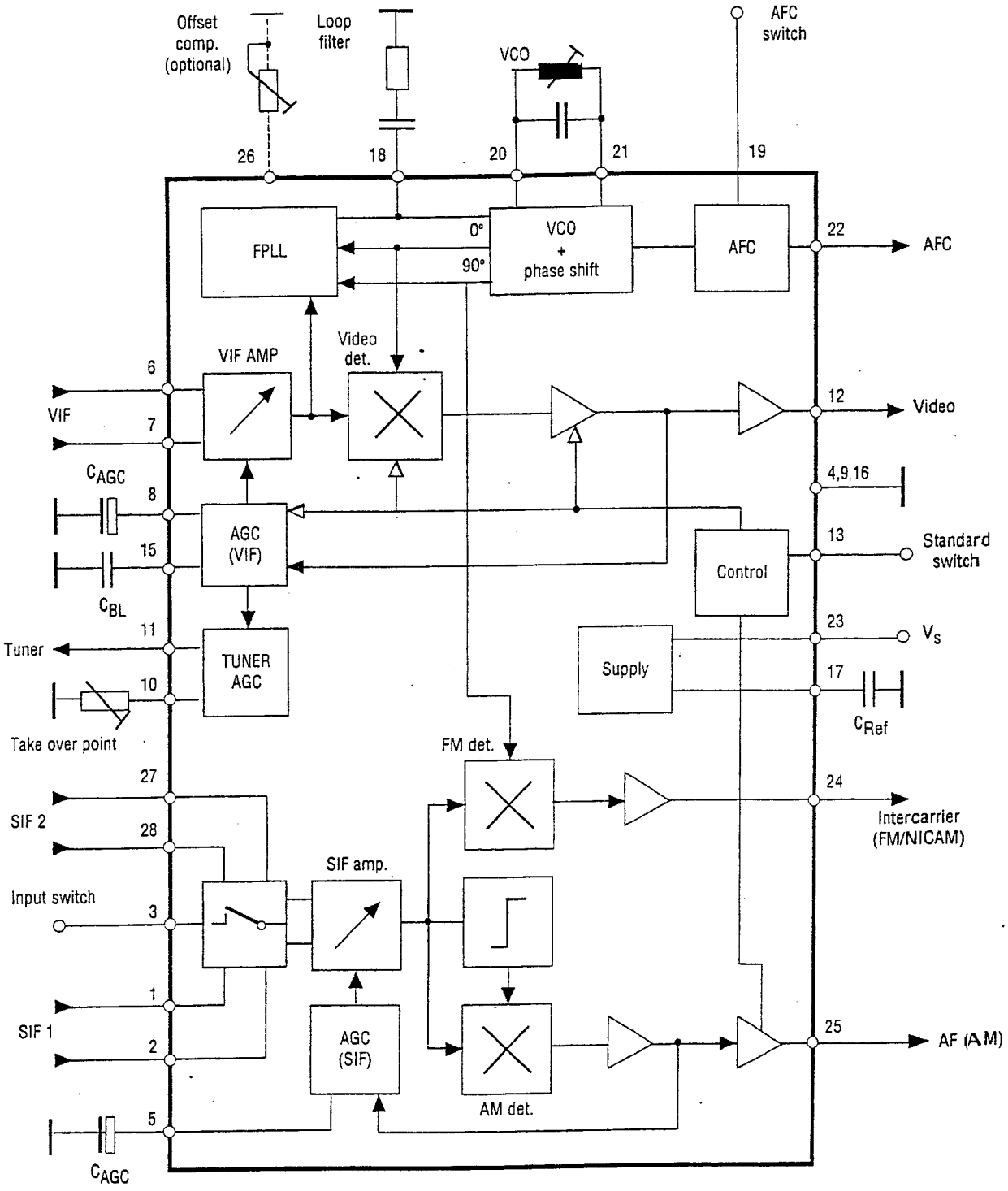
The AFC output signal at pin 22 can be controlled by a switching voltage at pin 19. It is possible to select an AFC output signal with rising- or falling AFC curve and to switch off the AFC.

VCR mode

For the VCR mode in a TV set (external video source selected) it is recommendable to switch off the IF circuit. With an external switching voltage at pin 6 or 7 the IF amplifier are switched off and all signal output levels at pin 12, 24, 25 are according to the internal DC voltage.

Internal voltage stabilizer

The internal bandgap reference ensures constant performance independant of supply voltage and temperature.



Block Diagram

Vertical Deflection and Guard Circuit (110°) TDA3654

GENERAL DESCRIPTION

The TDA3654 is a full performance vertical deflection output circuit for direct drive of the deflection coils and can be used for a wide range of 90° and 110° deflection systems.
A guard circuit is provided which blanks the picture tube screen in the absence of deflection current.

FEATURES

- Direct drive to the deflection coils
- 90° and 110° deflection system
- Internal blanking guard circuit
- Internal voltage stabilizer

QUICK REFERENCE DATA

Output voltage	V_{5-2}	max.	60 V
Output current (peak to peak)	$I_{5(p-p)}$	max.	3 A
Supply voltage	V_{9-2}	max.	40 V
Guard circuit output voltage	V_{7-2}	max.	5,6 V
Operating ambient temperature range	T_{amb}		-25 to + 60°
Storage temperature	T_{stg}		-55 to + 1 50°

THERMAL RESISTANCE

From junction to mounting base	$R_{th\ j-mb}$	3.5 to 4K/W

RATINGS

Limiting values in accordance with the absolute maximum system (I EC 134).
Pins 2 and 4 are externally connected to ground.

Voltages		
Output voltage	V_{5-4}	0 to 60 V
Supply voltage	V_{9-4}	0 to 40 V
Supply voltage output stage	V_{6-4}	0 to 60 V
Supply input voltage	V_{1-2}	0 to V9-4 V
Input voltage switching circuit	V_{3-2}	0 to V9-4 V
External voltage at pin 7	V_{7-2}	0 to 5.6 V
Currents		
Repetitive peak output current	$\pm I_5RM$	max. 1.5 A
Non-repetitive peak output current (note 1)	$\pm I_5SM$	max. 3 A
Repetitive peak output current of flyback generator	$\pm I_8RM$	max. +1.5 A -1.6 A
Non-repetitive peak output current of flyback generator (note 1)	$\pm I_8SM$	max. 3 A
Currents		
Storage temperature range	T_{stg}	-65 to+ 150°C
Operating ambient temperature range	T_{amb}	-25 to+ 60°C
Operating junction temperature range (the output current at pin 5 should not exceed 2.5A)	T_j	-25 to+ 150°C

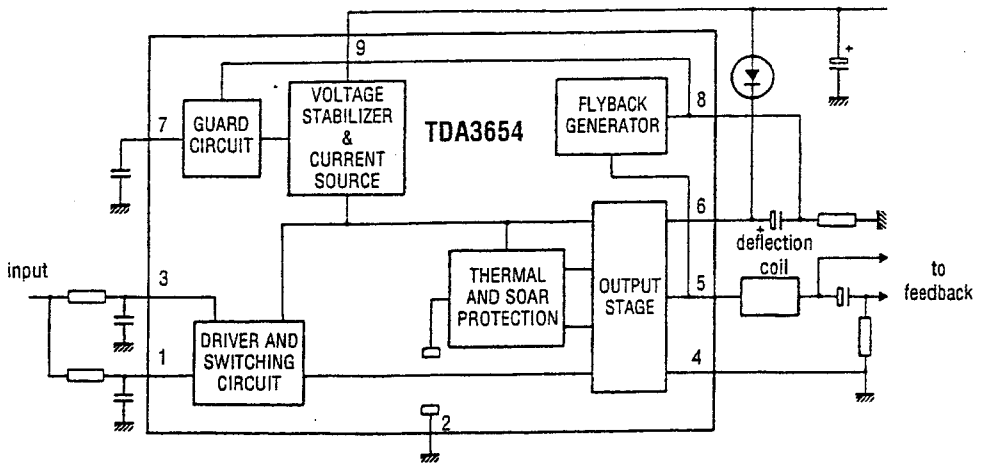
CHARACTERISTICS

Tamb= 25°C, supply voltage (V9-4) = 26V; unless otherwise stated; pin I externally connected to pin 3. Pins 2 and 4 externally connected to ground.

parameter	symbol	min.	typ.	max.	unit
Supply					
Supply voltage, pin 9 (note 2)	V_{9-4}	10		40	V
Supply voltage output stage	V_{6-4}	-	-	60	V
Supply current, pins					
6 and 9 (note 3)	I_6+I_9	35	55	85	mA
Quiescent current (note 4)	I_4	25	40	65	mA
Variation of quiescent current					
with temperature	TC	-	-0.04	-	mA/K
Output current					
Output current, pin 5					
(peak-to-peak)	$I_{5(p-p)}$	-	2.5	3	A
Output current flyback					
generator, pin 8	$+I_{8(p-p)}$	-	1.25	1.5	A
	$-I_{8(p-p)}$	-	1.35	1.6	A
Output voltage					
Peak voltage during flyback	V_{5-4}	-	-	60	V
Saturation voltage to supply					
at I_5 = -1.5 A	$V_{6-5(sat)}$	-	2.5	3.2	V
at I_5 = -1.5 A (note 5)	$V_{5-6(sat)}$	-	2.5	3.2	V
at I_5 = -1.2 A	$V_{6-5(sat)}$	-	2.2	2.7	V
at I_5 = -1.2 A (note 5)	$V_{5-6(sat)}$	-	2.3	2.8	V
Saturation voltage to ground					
at I_5 = 1.2 A	$V_{5-4(sat)}$	-	2.2	2.7	V
at I_5 = 1.5 A	$V_{5-4(sat)}$	-	2.5	3.2	V
Flyback generator					
Saturation voltage					
at I_8 = -1.6 A	$V_{9-8(sat)}$	-	1.6	2.1	V
at I_8 = -1.5 A (note 5)	$V_{8-9(sat)}$	-	2.3	3	V
at I_8 = -1.3 A	$V_{9-8(sat)}$	-	1.4	1.9	V
at I_8 = -1.2 A (note 5)	$V_{8-9(sat)}$	-	2.2	2.7	V
Leakage current at pin 8	$-I_8$	-	5	100	µA
Flyback generator active if:	V_{5-9}	4	-	-	V

CHARACTERISTICS (continued)

parameter	symbol	min.	typ.	max.	unit
Input					
Input current, pin 1, for I_5=1.5 A	I_1	-0.33	0.55		mA
Input voltage during scan, pin 1	V_{1-2}	-	2.35	3	V
Input current, pin 3, during scan (note 6)	I_3	0.03	-	-	mA
Input voltage, pin 3, during scan (note 6)	V_{3-2}	0.8	-	V_{9-4}	V
Input voltage, pin 1, during flyback	V_{1-2}	-	-	250	mV
Input voltage, pin 3, during flyback	V_{3-2}	-	-	250	mV
Guard circuit					
Output voltage, pin 7, R_L=1xx KΩ (note 9)	V_{7-2}	4.1	4.5	5.8	V
Output voltage, pin 7 at I_L=0.5 mA (note 9)	V_{7-2}	3.4	3.9	5.3	V
Internal series resistance of pin 7	Ri_7	0.95	1.35	1.7	KΩ
Guard circuit activates (note 7)	V_{8-2}	-	-	1.0	V
General Data					
Thermal protection activation range	T_j	158	175	192	°C
Thermal resistance					
From junction to mounting base	R_{thj-mb}	-3.5	4	k/W	
Power dissipation	P_{tot}	-			
Open loop gain at 1kHz, (note 8)	G_o	-	33	-	
Frequency response, -3dB (note 10)	f	-	60	-	kHz



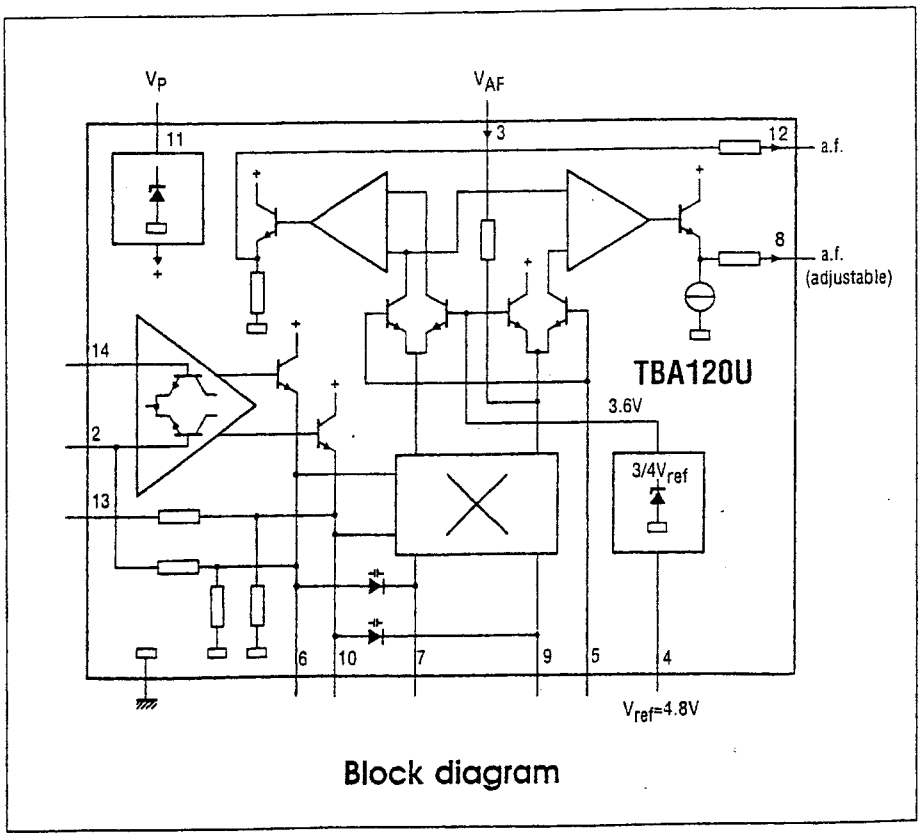
Sound IF Amplifier / Demodulator for TV TBA120U

The TBA120U is an IF amplifier with a symmetrical FM demodulator and an AF amplifier with adjustable output voltage. The a.f. amplifier is also provided with an output for volume control and an input for VCR operation.

The input and outpur of the TBA120U are specially designed for LC-circuits, hut the input can also be used with a ceramic filter.

QUICK REFERENCE DATA

Supply voltage (pin 11)·	V_P	typ.	12V
Supply current	I_P	typ.	13.5 mA
I.F. voltage gain at f = 5~5 MHz	$G_{v\ if}$	typ.	68 dB
Input voltage starting limiting	V_i	typ.	30 µV
AM suppression at ~f = ~ 50 kHz	α	typ.	60 dB
A.F. output voltage adjustment range (pin 8)	$\Delta V_{o\ af}$	typ.	85 dB
A.F. output voltage at ~If = ~ 50 kHz (r.m.s. value)			
at pin 8	$V_{o\ af(rms)}$	typ.	1.2 V
at pin 12	$V_{o\ af(rms)}$	typ.	1.0 V

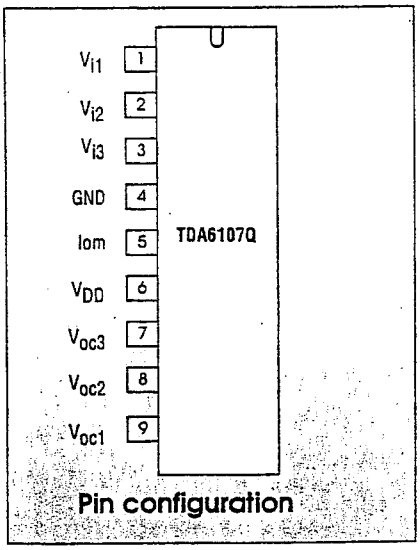


Block diagram

Video Output Amplifier TDA6107Q

PINNING

SYMBOL	PIN	DESCRIPTION
V_{i1}	1	inverting input 1
V_{i2}	2	inverting input 2
V_{i3}	3	inverting input 3
GND	4	Ground, fin
Iom	5	BCS-output
V_{DD}	6	supply voltage
V_{oc3}	7	cathode output 3
V_{oc2}	8	cathode output 2
V_{oc1}	9	cathode output 1



Pin configuration

FUNCTIONAL PIN DESCRIPTION

A functional pin description is given below.

Pin 1,2,3. This is the inverting input.The input configuration consist of a resistor Ri connected to a virtual "ground". This virtual "ground" is the negative input of an operational amplifier and has a DC level of 2.5 V which is directly related to the internal reference voltage of 2.5 Volts.

Pin 4. Ground.

Pin 5. This is the black current measurement output for automatic black current stabilisation (ABS).

To prevent that high video currents will flow in the TDA837X/TDA884X measuring input, the voltage on pin 5 of the TDA6107Q-N1 is limited by an internal built in zener diode of 7 volts.

The off-set current of pin5 amounts to +/- 12 µA typ. at 3V

Pin 6. High-voltage supply Vdd.

This is the supply pin of the device. As already described, the TDA6107Q-N1 does not need a 12 V supply, this means that the current for the low voltage part is delivered by the Vdd.

The pin has to be decoupled by two capacitors, one for high frequency and the other for low frequency decoupling. The value and the position of these capacitors is very important.

Pin 7,8,9. Cathode output.

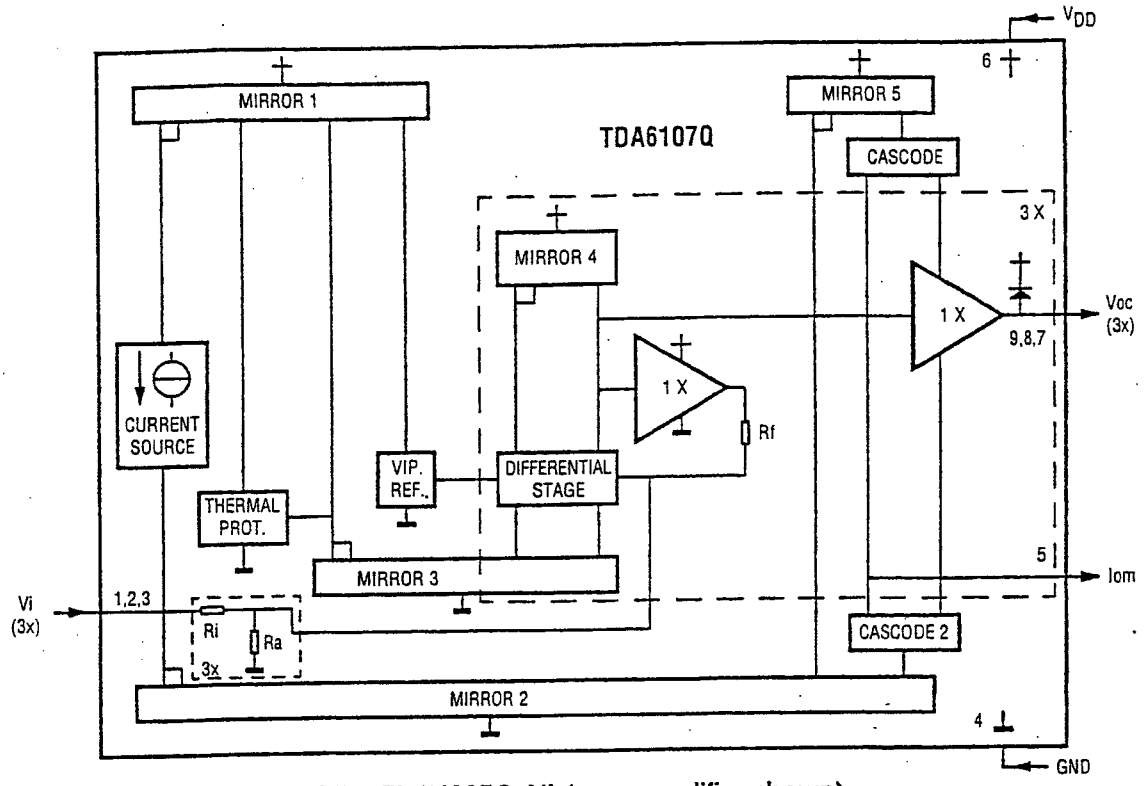
The video output current is delivered by a quasi complementary class-A/B push-pull stage, designed in DMOS technology and can source and sink a current of 20mA, for video output voltages of 100Vp-p with rise and fall times of 68 nSec (20%-80%).

A feature of this output stage is the low saturation voltage (typ. 10V) and the low voltage drop at high level (typ.Vdd-10V).

This output pin has to be connected to the cathode of the CRT via a standard resistor of 100Ω and a high-voltage flash-over protection resistor of 1kΩ

A high surge clamping diode has to be applied externally, so that the cathode output voltage clamps at Vdd+Vdiode.

CIRCUIT DESCRIPTION



Block diagram of the TDA6107Q-NI (one amplifier shown).

The TDA6107Q-N1 consist of three monolithic video output amplifiers. The amplifier can be seen as an operational amplifier with negative feedback.

The advantage of negative feedback is that the amplifier characteristics do not play an important role up to certain frequencies.

External flash diodes combined with flash resistors and sparkgaps protect the amplifiers against flash over in the picture tube.

The TDA6107Q-N1 has an internal thermal protection circuit which gives a decrease of the slew rate at high temperatures.

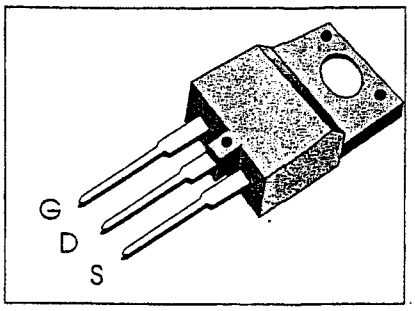
Furthermore, the device needs only one power supply voltage(Vdd).

In contrast to previous types of DMOS video amplifiers, the external resistors (Rf,Ri and Ra) are integrated, so the gain is fixed and saves 9 resistors.

Furthermore the reference voltage is integrated, it saves a resistor divider and a decoupling capacitor. So, the replacement value of the TDA6107Q-N1 is very high.

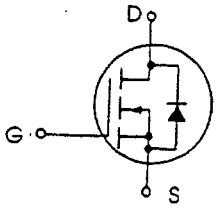
The TDA6107Q-N1 is provided with a black current data pin.

Power Field Effect Transistor
BUZ90



GENERAL DESCRIPTION

This TMOS IV Power FET is designed for high voltage, high speed, low loss power switching applications such as switching regulators, converters, motor controls, solenoid and relay drivers.



FEATURES

- Silicon gate for fast switching speeds
- Low $r_{DS(on)}$ – 2Ω max
- Rugged – SOA is power dissipation limited
- Source-to-drain diode characterized for use with inductive loads
- Low drive requirement $-V_{GS(th)}$ = 4 V max.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain-source voltage	V_{DSS}	600	Vdc
Drain-gate voltage (R_{GS} = 20kΩ)	V_{DGR}	600	Vdc
Gate-source voltage	V_{GS}	±20	Vdc
Drain current – continuous (T_C = 25°C)	I_D	4	Adc
–Pulsed	I_{DM}	16	
Total power dissipation @T_C = 25°C	P_D	75	Watts
Derate above 25°C		0.6	W/°C
Operating and storage temperature range	T_j, T_{stg}	-55 to 150	°C

THERMAL CHARACTERISTICS

Thermal Resistance Junction to case	$R_{\theta JC}$	1.67	°C/W
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T_L	275	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max.	Unit
OFF CHARACTERISTICS					
Drain-source breakdown voltage (V_{GS}) = 0, I_D = 0.25 mA)	$V_{(BR)DSS}$	600	-	-	Vdc
Zero gate voltage drain current	I_{DSS}				µAdc
(V_{DS} = 600 Volts, V_{GS} =0)		20	-	250	
(V_{DS} = 600 Volts, V_{GS} =0,Tj = 125°C)		100	-	1000	
Gate-body leakage current, forward (V_{GSF} = 20Vdc, V_{DS} =0)	I_{GSSF}	-	10	100	nAdc
Gate-body leakage current, reverse (V_{GSR} = 20Vdc, V_{DS} =0)	I_{GSSR}	-	10	100	nAdc

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

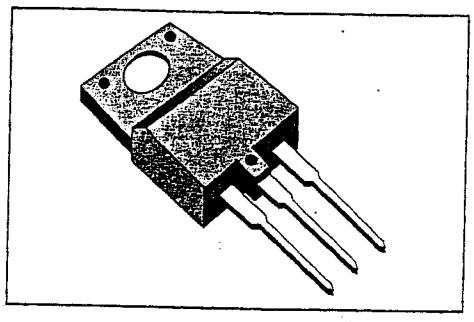
Characteristic	Symbol	Min	Typ	Max.	Unit
ON CHARACTERISTICS					
Gate threshold voltage (V_{DS} = V_{GS}, I_D = 1mA)	$V_{GS(th)}$	2.1	3	4	Vdc
Static drain-source on-resistance (V_{GS} = 10 Vdc, I_D = 2.5 Adc)	$r_{DS(on)}$	–	1.8	2	Ohm
Drain-source on-voltage (V_{GS} =10 v) (I_D = 2.5 Adc)	$V_{DS(on)}$	–	4.5	–	Vdc
Forward Transconductance (V_{DS} =25V, I_D =2.5 A)	gFS	1.5	2.5	–	mhos
DYNAMIC CHARACTERISTICS					
Input capacitance	C_{iss}	–	–	2000	pF
Output capacitance (V_{DS} = 25 V, V_{GS} = 0, f = 1 MHz)	C_{oss}	–	–	170	
Reverse transfer capacitance	C_{rss}	–	–	70	
SWITCHING CHARACTERISTICS					
Turn-on delay time	$t_{d(on)}$	–	–	45	ns
Rise time (V_{DD} =30 V, I_D = 2.5 A, V_{GS} = 10 V, R_{gen} = 50 ohms)	t_r	–	–	60	
Turn-off delay time	$t_{d(off)}$	–	–	140	
Fall time	tf	–	–	60	
SOURCE DRAIN DIODE CHARACTERISTICS					
Forward on-Voltage (I_S = 8 A, V_{GS} = 0)	V_{SD}	–	0.95	1.2	Vdc
Forward turn-on time (I_S= 4 A, DI_s/dt = 100 Aμs	t_{on}	Limited by stray inductance			
Reverse recovery time (V_R = 100 V, V_{GS} = 0)	t_{rr}	–	1200	–	ns

CRT Horizontal Deflection High Voltage NPN Fastwitching Transistor BUH515D

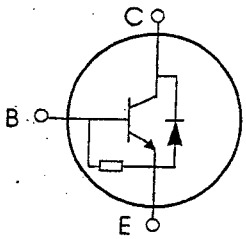
- High breakdown voltage capability
- Fully insulated package for easy mounting
- Low saturation voltage
- High switching speed
- Complete characterization of power losses and switching times as a function of negative base current for optimum drive

APPLICATIONS:

- Horizontal deflection stage in standard and high resolution dis-plays for TV's and monitors



INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-Base Voltage (I_E = 0)	1500	V
V_{CEO}	Collector-Emitter Voltage (I_B = 0)	700	V
V_{EBO}	Emitter-Base Voltage (I_C = 0)	5	V
I_C	Collector Current	8	A
I_{CM}	Collector Peak Current (t_p < 5 ms)	15	A
I_B	Base Current	5	A
I_{BM}	Base Peak Current (t_p < 5 ms)	8	A
P_{tot}	Total Dissipation at Tc = 25°C	60	W
T_{stg}	Storage Temperature	-65 to 150	°C
T_j	Max. Operating Junction Temperature	150	°C

BUH515D

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-case	Max	2.08	°C/W

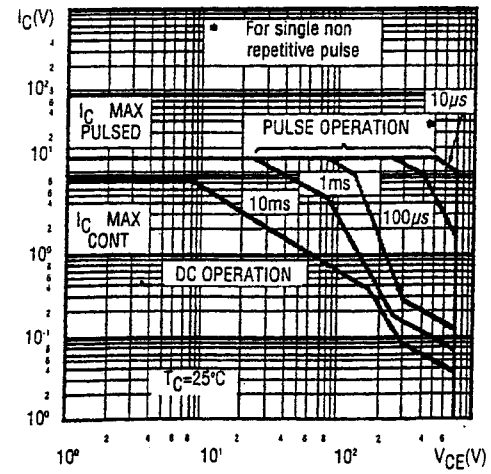
ELECTRICAL CHARACTERISTICS (Tcase = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 1500 V V_{CE} = 1500 V T_j = 125°C			1 2	mA mA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 5 V			300	mA
$V_{CE(sat)}$*	Collector-Emitter Saturation Voltage	I_C = 5 A I_B = 1.25 A			1.5	V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = 5 A I_B = 1.25 A			1.3	V
h_{FE}*	DC Current Gain	I_C = 5 A V_{CE} = 5 V I_C = 5 A V_{CE} = 5 V T_J = 100 °C	5 3			
t_s t_f	RESISTIVE LOAD Storage Time Fall Time	Vcc = 400 V I_C = 5 A I_{B1} = 1.25 A I_{B2} = 2.5 A		2.4 170	3.6 260	µs ns
t_s t_f	INDUCTIVE LOAD Storage Time Fall Time	I_C = 5 A f = 15625 Hz I_{B1} = 1.25 A I_{B2} = 2.5 A $V_{ceflyback} = 1050 \sin\left\{\frac{\pi}{10} 10^6\right\} t$ V		3.5 4.50		µs ns
V_f	Diode Forward Voltage	I_F = 5 A			2	V

* *Pulsed: Pulse duration = 300 µs, duty cycle 1.5%*

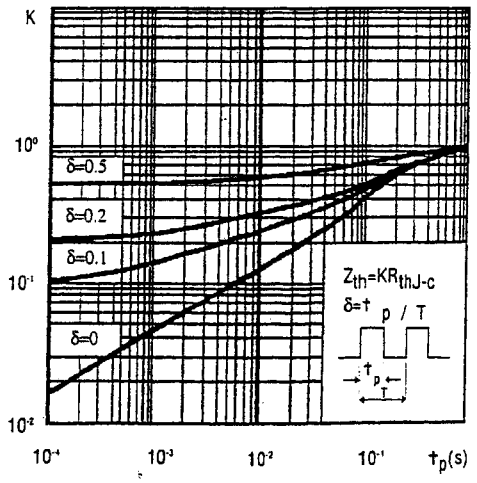
Safe operating Areas

GC32910

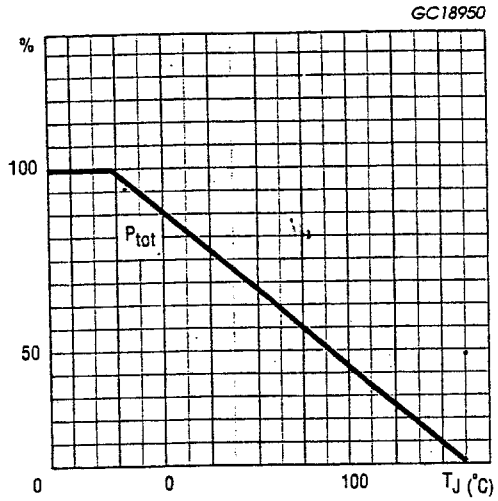


Thermal Impedance

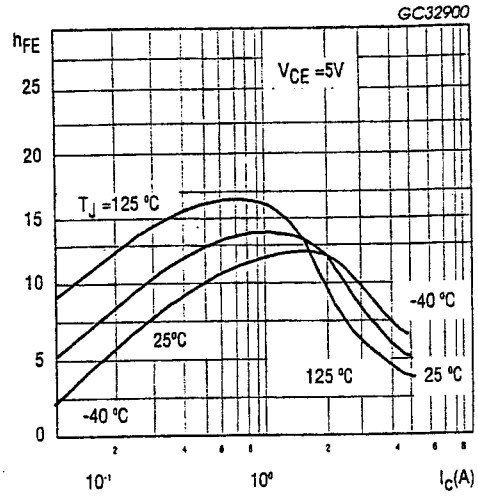
GC32710



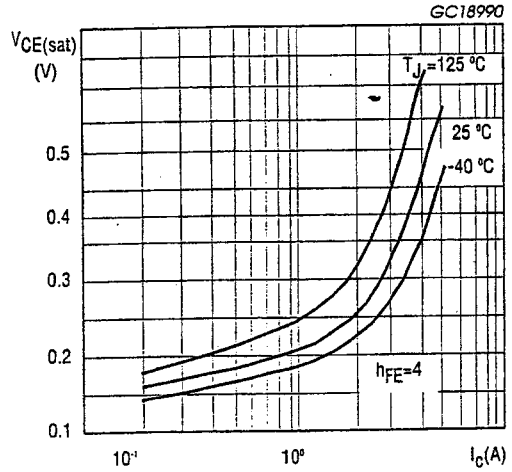
Derating Curves



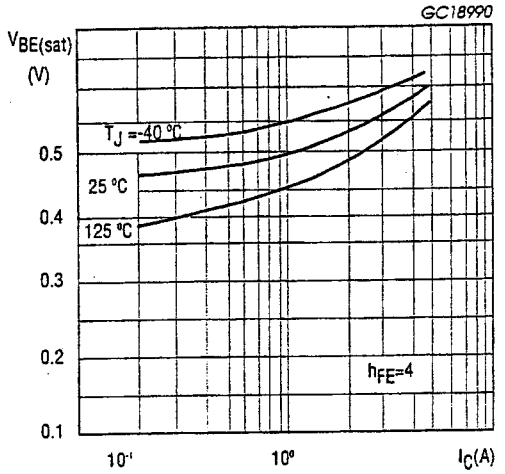
DC Current Gain



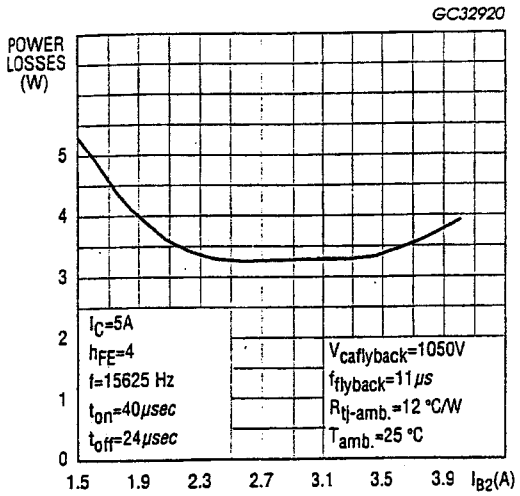
Collector-Emitter Saturation Voltage



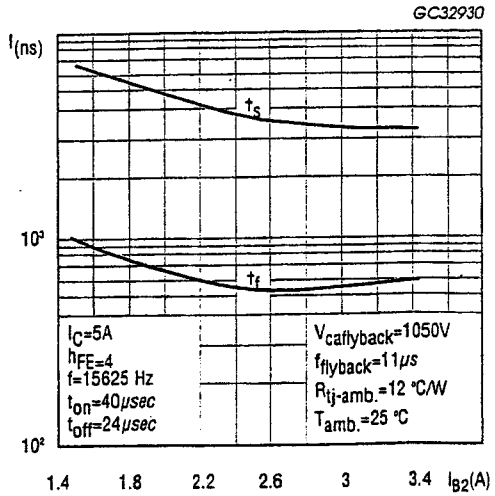
Base-Emitter Saturation Voltage



Power Losses at 16 KHz



Switching Time Inductive Load 16 KHz



Triple 2- Channel Analogue Multiplexer/Demultiplexer HEF4053B

The HEF4053B is a triple 2-channel analogue multiplexer / demultiplexer with a common enable input ($\overline{E}$). Each multiplexer / demultiplexer has two independent inputs/ outputs (Y_0 and Y_1), a common input/output (Z), and select inputs (S_n). Each also contains two-bidirectional analogue switches, each with one side connected to an independent input/output (Y_0 and Y_1) and the other side connected to a common input/output (Z).

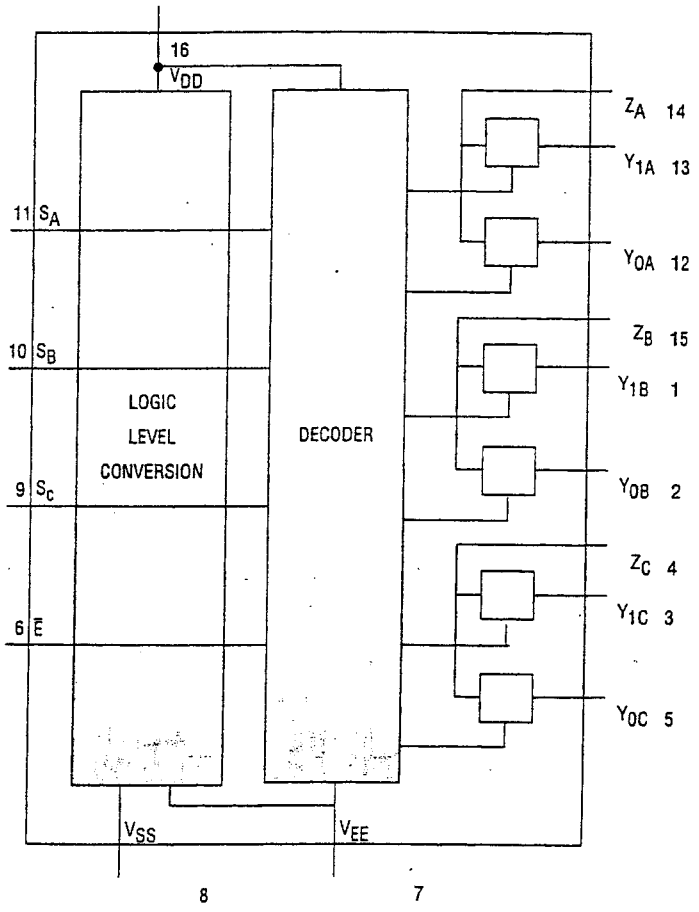
With $\overline{E}$ LOW, one of the two switches is selected (low impedance ON-state) by S_n. With $\overline{E}$ HIGH, all switches are in the high impedance OFF-state, independent of S_A to S_C.

V_{DD} to V_{SS} are the supply voltage connections for the digital control inputs (S_A to S_C and $\overline{E}$).

The V_{DD} to V_{SS} range is 3 to 15 V. The analogue inputs/outputs (Y_0, Y_1 and Z) can swing between V_{DD} as a positive limit and V_{EE} as a negative limit. V_{DD}-V_{EE} may not exceed 15 V.

For operation as a digital multiplexer / demultiplexer, V_{EE} is connected to V_{SS} (typically ground).

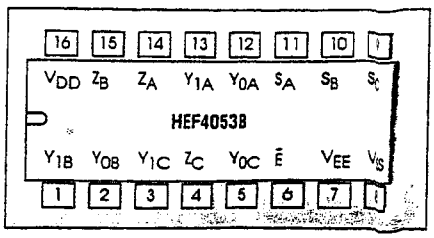
FUNCTIONAL DIAGRAM



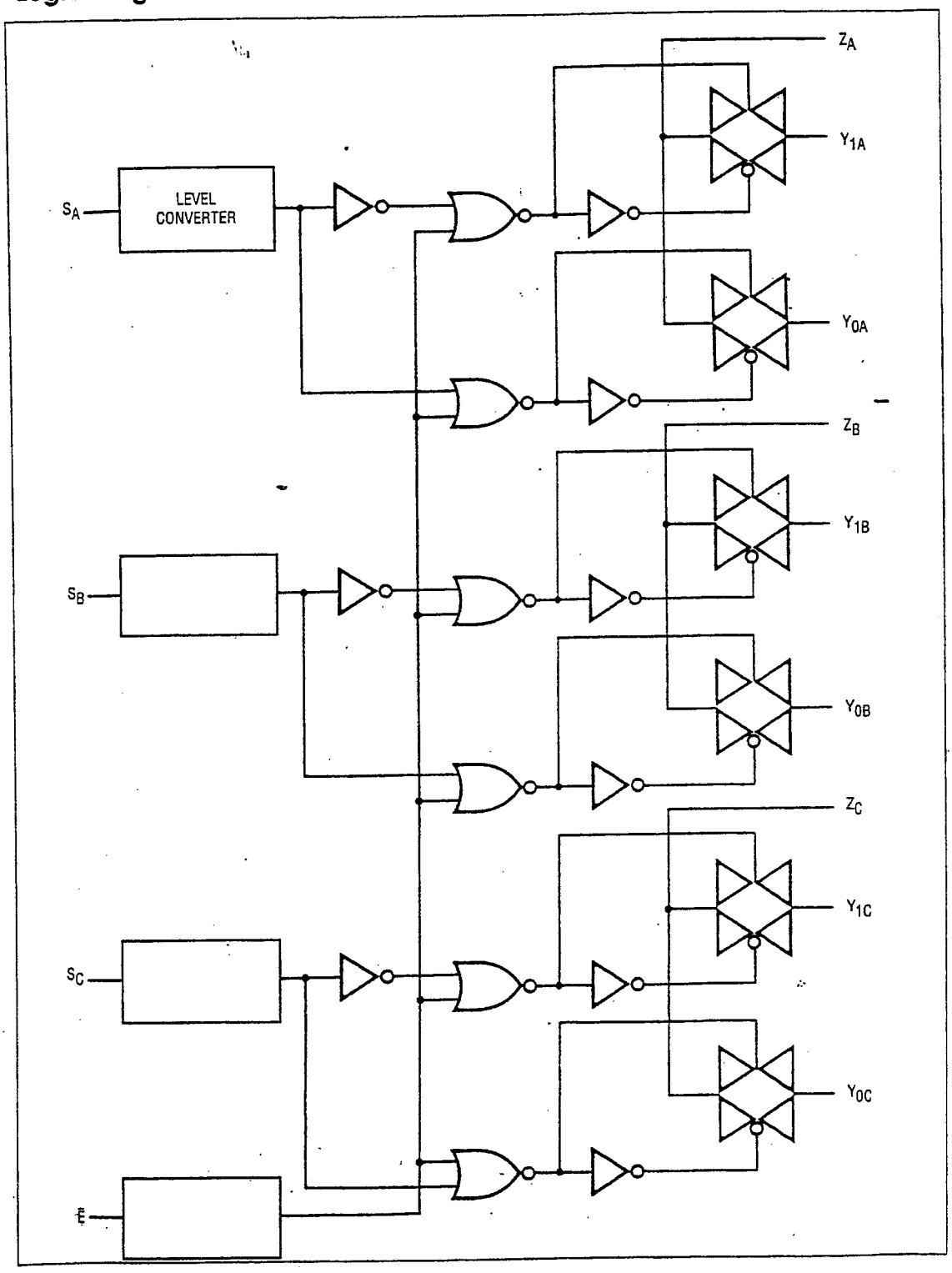
PINNING

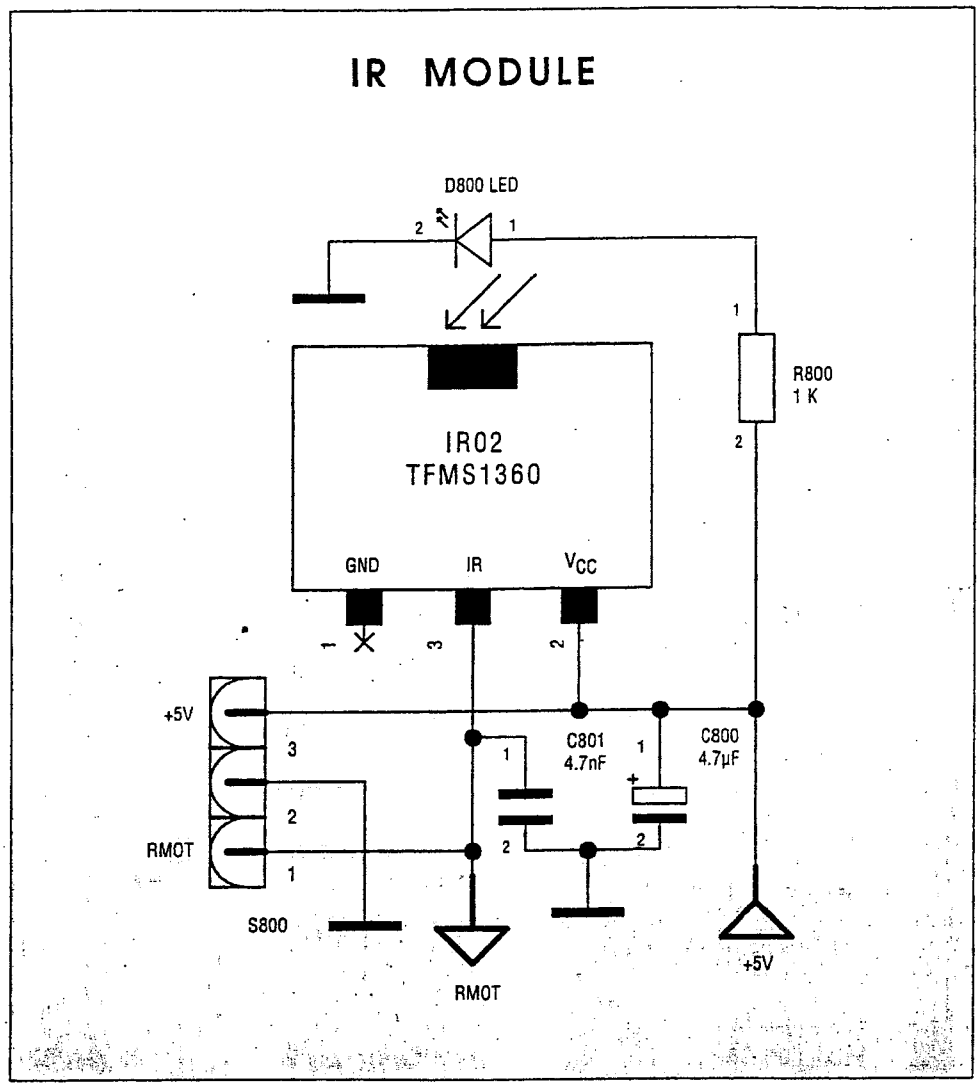
Y_{0A} to Y_{0C}		independent inputs/outputs
Y_{1A} to Y_{1C}		independent inputs/outputs
S_A to S_C		select inputs
$\overline{E}$	4	enable input (active LOW)
Z_A to Z_C	5	common inputs/outputs

Pinning Diagram



Logic Diagram

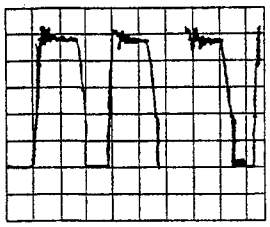




Remote Sensor Circuit

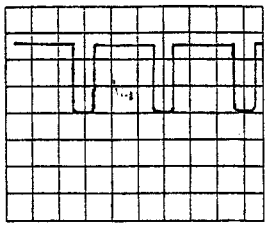
OSCILLOSCOPE SIGNALS

1) 5usn/100 volts/div



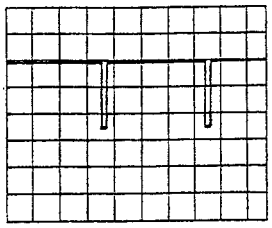
Drain of Q101

2) 20 usn/2 volts/div



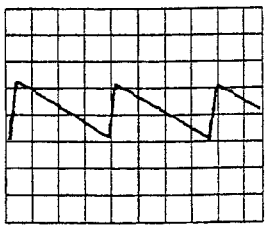
I301 pin 36

3) 5 msn/2 volts/div



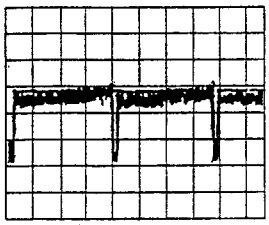
I301 pin 37

4) 5 msn/0.5 volt/div



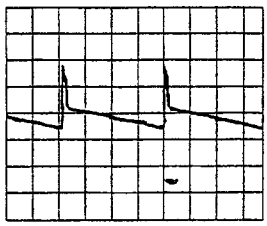
I101 pin 42

5) 5msn/1 volt/div



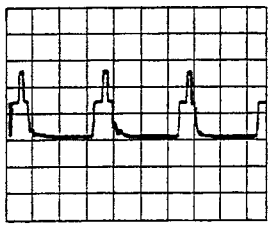
I576 pin 3

6) 5msn/20 volts/div



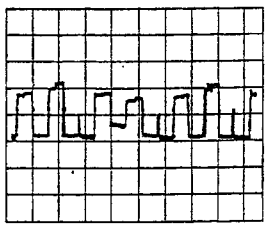
I576 pin 5

7) 20usn/2 volts/div



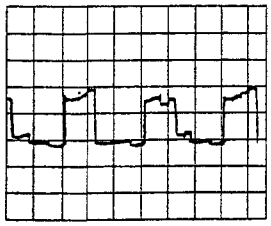
I101 pin 38

8) 20usn/div 2 volt/div



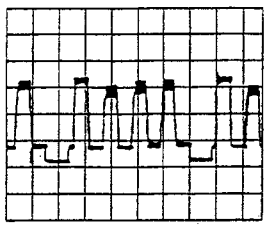
I101 pin 20

9) 20usn/2 volts/div



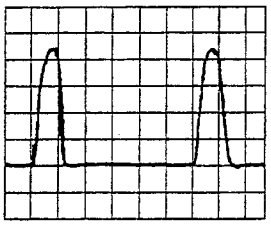
I101 pin 19

10) 10usn/2 volts/div



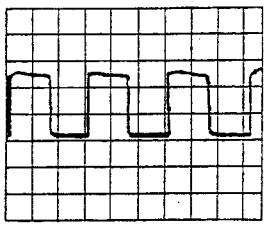
I101 pin 18

11) 10usn/250 volts/div



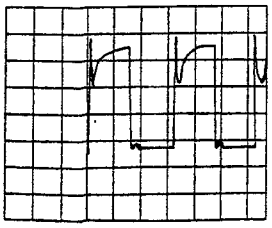
Collector of Q602

12) 20 usn/0.5 volt/div



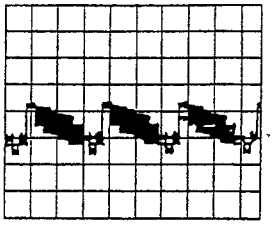
I101 pin 37

13) 20msn/50 volts/div

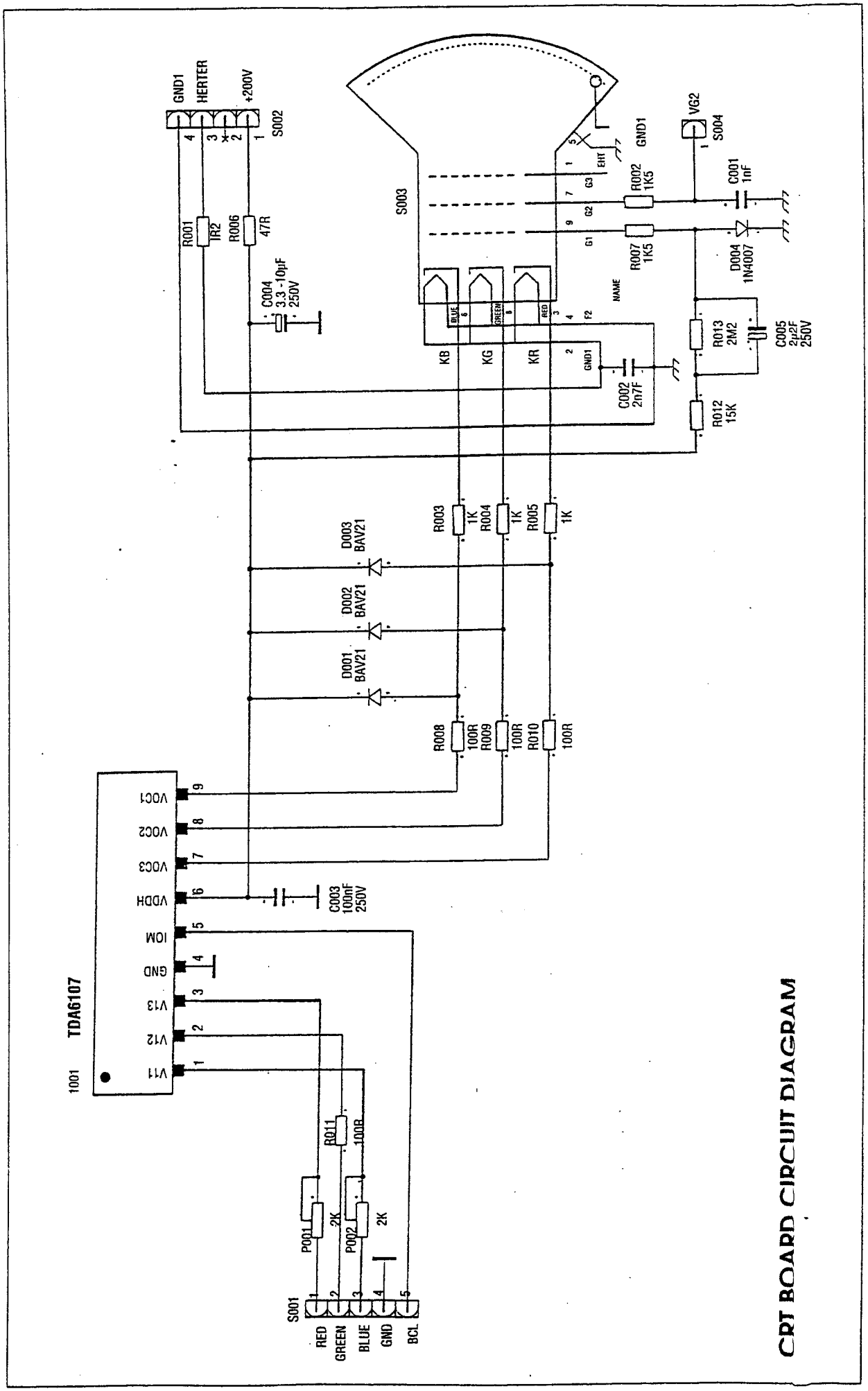


Collector of Q580

14) 20usn/1 volt/div

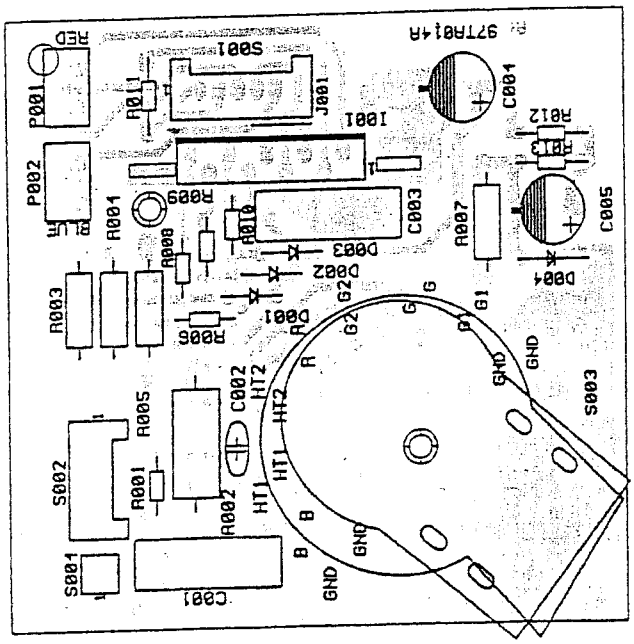


I101 pin 13

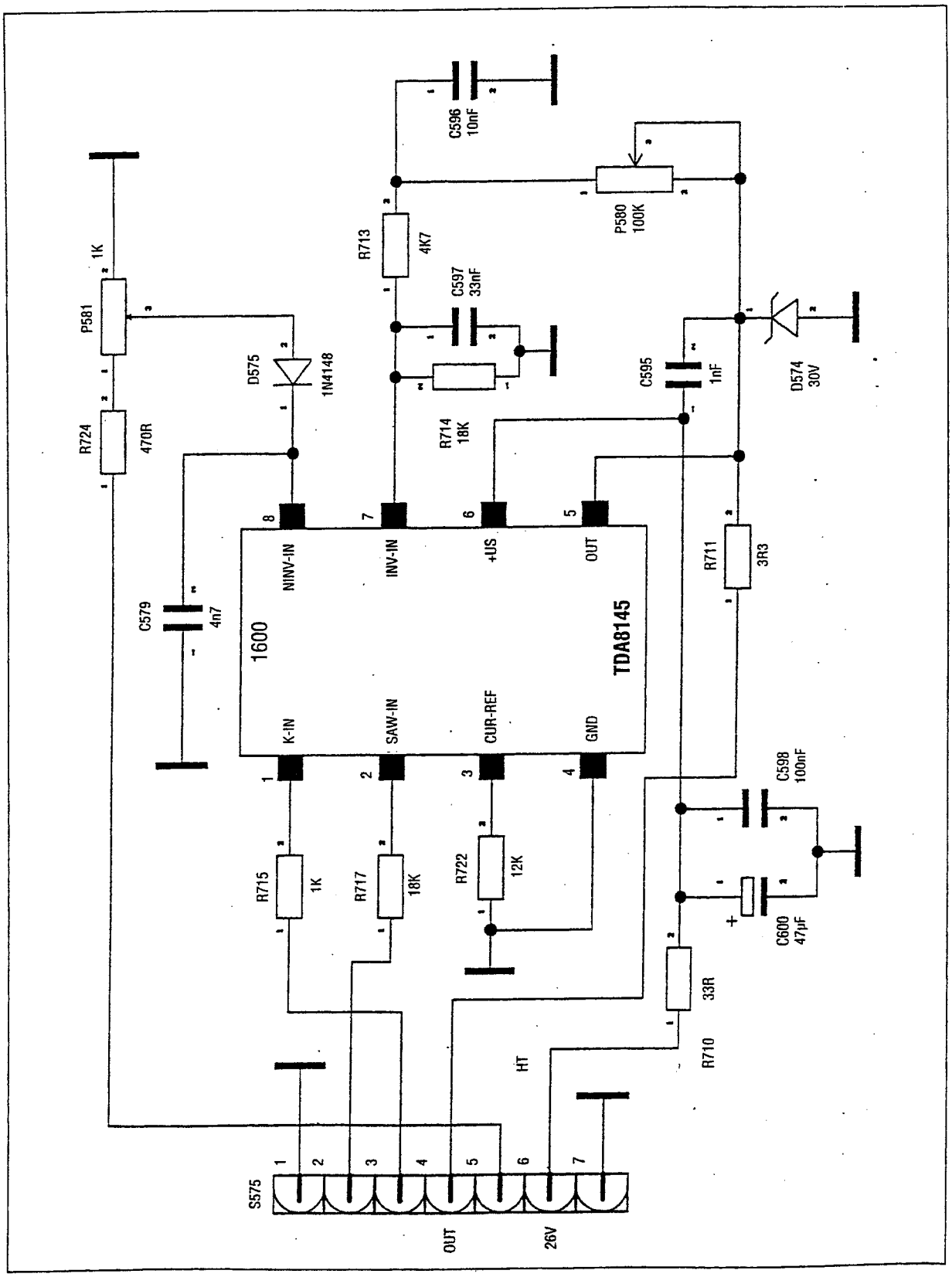


CRT BOARD CIRCUIT DIAGRAM

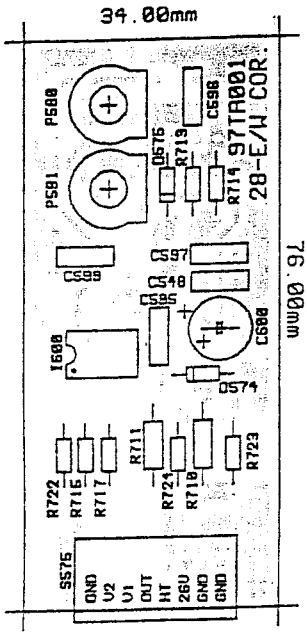
CRT BOARD LAYOUT

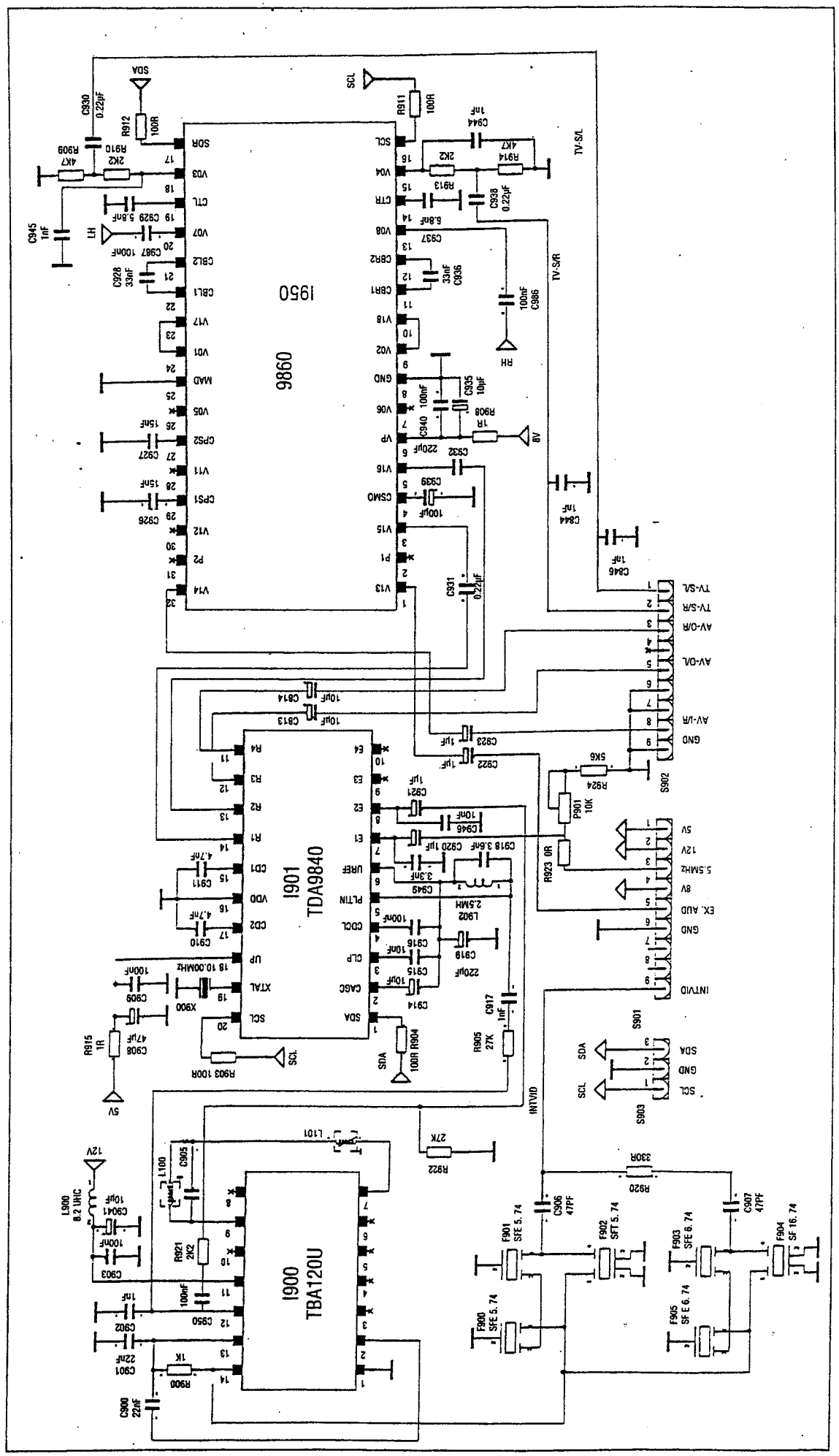


E/W BOARD CIRCUIT DIAGRAM



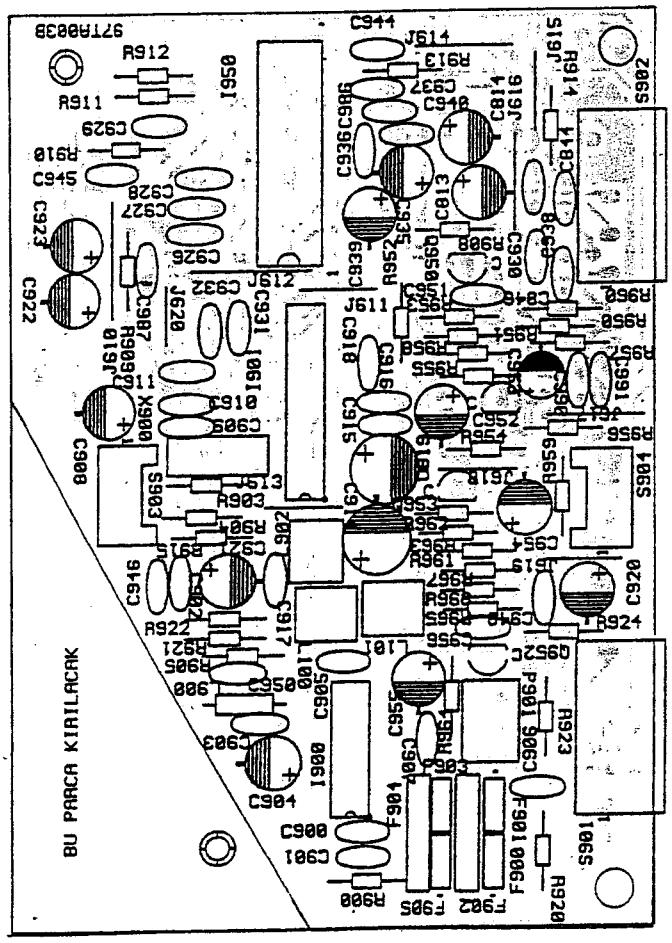
E/W BOARD LAYOUT

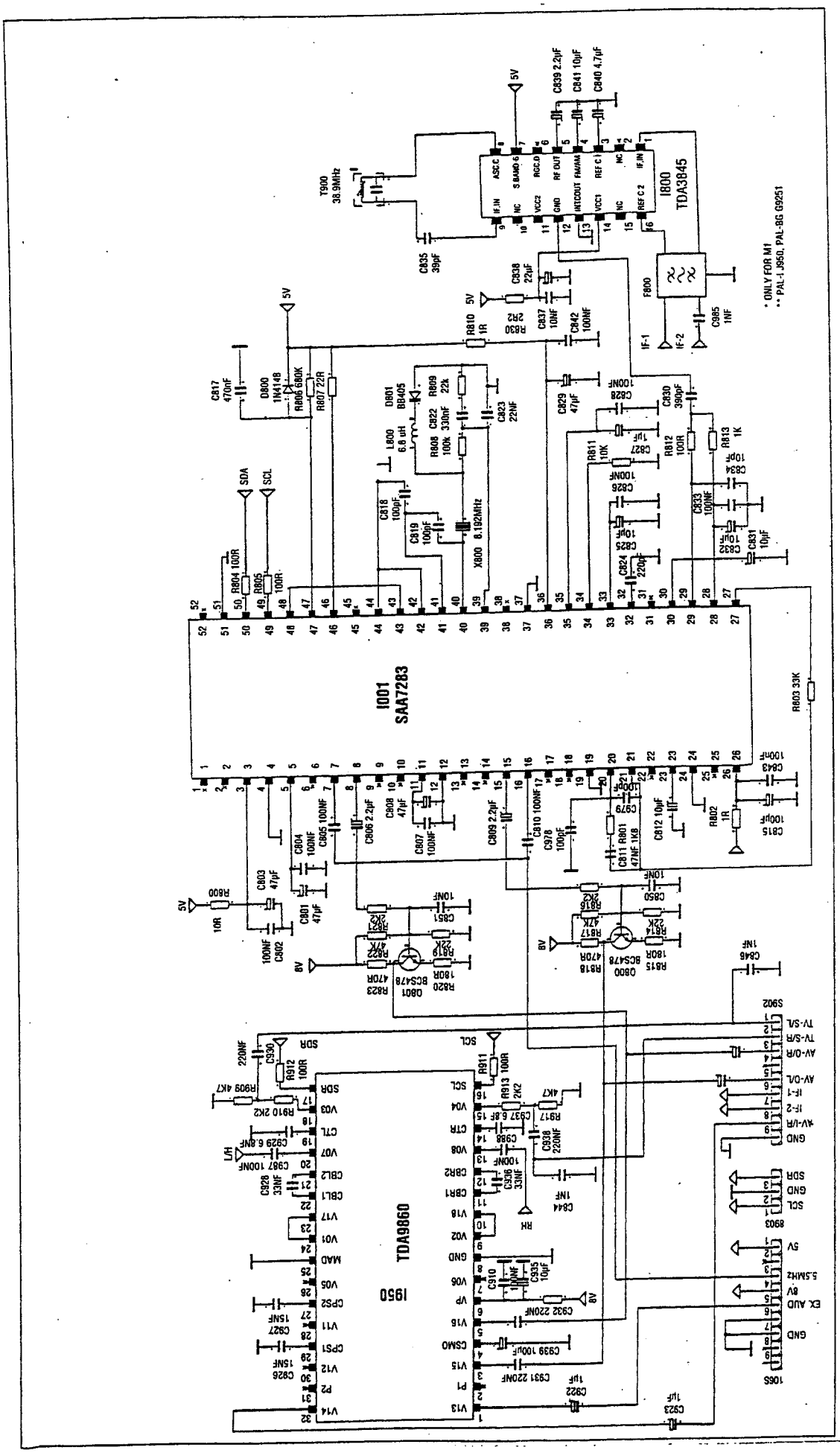




GERMAN STEREO BOARD CIRCUIT DIAGRAM

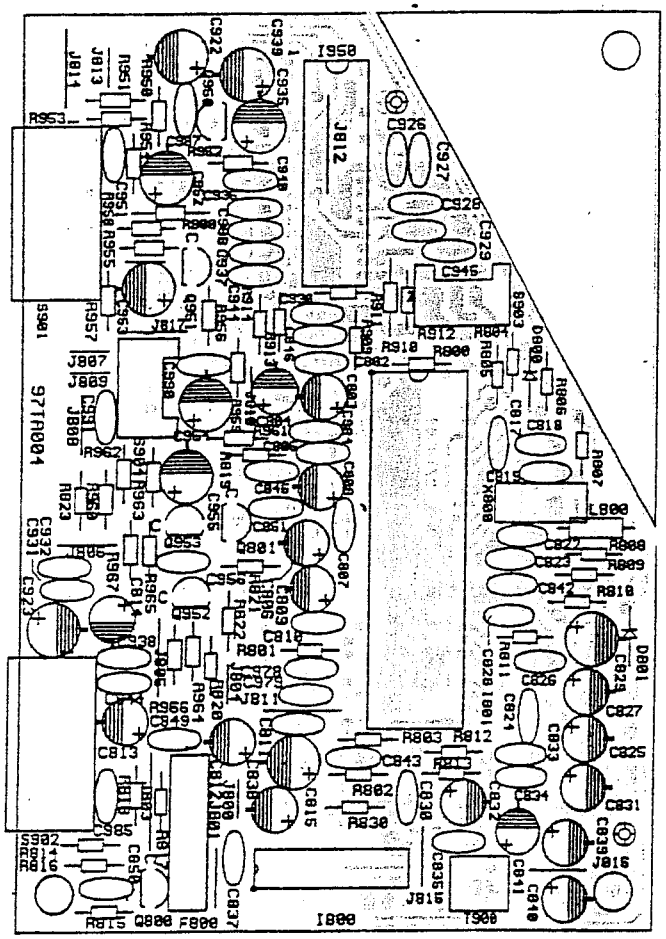
GERMAN STEREO LAYOUT



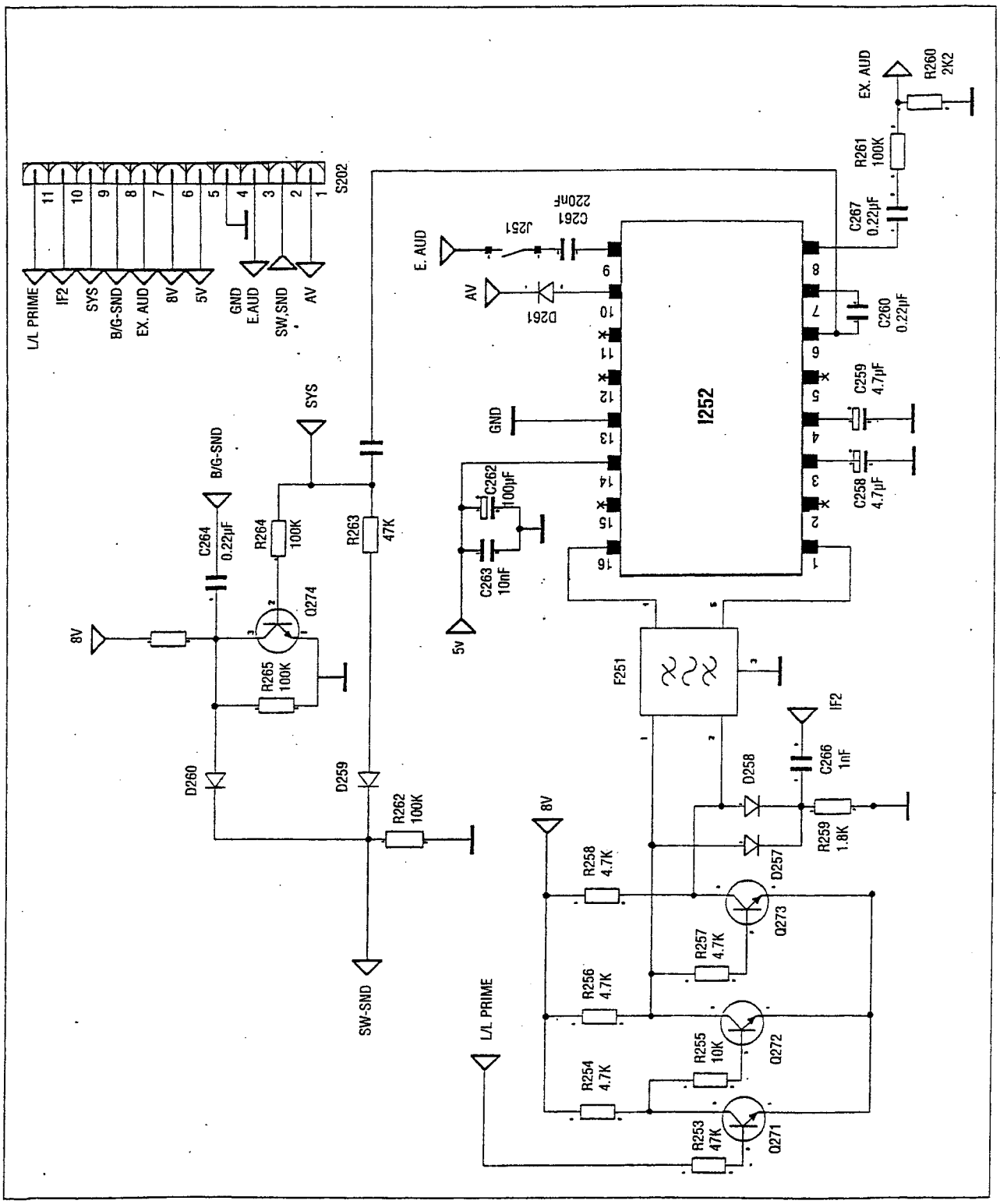


NICAM BOARD CIRCUIT DIAGRAM

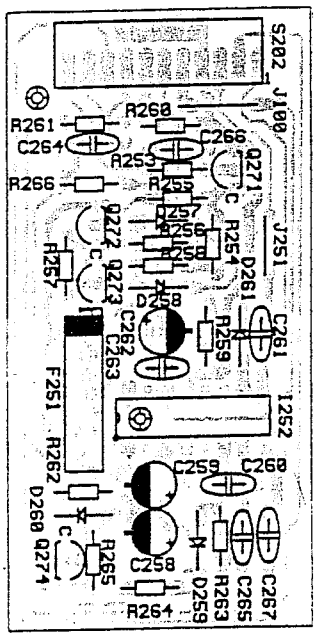
NICAM BOARD LAYOUT



MONO SECAM L/L' BOARD CIRCUIT DIAGRAM



MONO SECAM L/L' LAYOUT



PIN VOLTAGES OF IC'S

Pin.	CTV811S	24C08/PCF8594C		TDA8361A	TDA4665	TDA2616	TDA3654	TDA4605
1	1.5V	0V	0V	2.9V	5V	15V	2.2V	0.4V
2	0V	0V	0V	5.80V	0V	30V	0V	1.2V
3	0V	0V	0V	5.8V	0V	15V	2.2V	1.9V
4	1.7V	0V	0V	7.3V	0V	15.2V	0V	0V
5	1.8V	3.15V	3.3V	3.25V	0.5V	0V	13.2V	2.8V
6	2.4V	3.6V	3.3V	3.8V	0V	15.2V	27V	10.73V
7	2.5V	4.5V	5V	3.1V	0V	30.4V	1.6V	1.9V
8	0V	5V	5V	1.8V	0V	15.2V	3.5V	0.4V
9	2.75V			1V	5V	15V	26V	
10	0V			7.8V	0V			
11	0V			0V	3V			
12	4.28V			3.28V	3V			
13	0V			4.32V	0V			
14	4.23V			4.15V	1.4V			
15	-			3.4V	0V			
16	-			0V	1.4V			
17	-			2.1V				
18	-			1.8V				
19	-			2V				
20	5V			1.7V				
21	0V			0.3V				
22	0V			3.37V				
23	2.6V			3.37V				
24	0V			3.37V				
25	2.26V			1.8V				
26	2.41V			1.8V				
27	0V			5.85V				
28	0V			3.86V				
29	-			3.86V				
30	-			1.47V				
31	5V			1.5V				
32	0V			0V				
33	0V			5.14V				
34	0V			2.8V				
35	0V			2V				
36	3.8V			8V				
37	4.7V			0.5V				
38	5V			0.43V				
39	5V			3V				
40	0V			3.6V				
41	-			0V				
42	2.5V			2.35V				
43	0V			2.8V				
44	5V			3.58V				
45	5.4V			3.95V				
46	-			3.95V				
47	5V			4.28V				
48	0V			4.55V				
49	3.5V			0.37V				
50	3.5V			3.43V				
51	0V			4.5V				
52	0V			6.57V				

* All voltages are in Volt
* Readingsare taken with a digital multimeter.
* Readingsare taken with PAL B/G colour-bar signal input
* Measurements are taken when there is not any on the screen.

* Sound min.
  Contrast
  Brightness } Normal
  Color

PIN VOLTAGES OF IC'S

Pin.	TDA8145	TDA6107Q	SAA7283	TDA9860	TBA120U	TDA3845
1	13.42V	2V	4.7V	3.9V	0V	1.75V
2	13.42V	2.13V	2.3V	-	-	-
3	8V	2.55V	4.8V	3.9V	-	1.95V
4	0V	0V	0V	3.9V	-	4.38V
5	8.5V	5.70V	2.3V	3.9V	-	0.1V
6	17.6V	200V	1.7V	8V	-	-
7	1V	158V	2.4V	-	-	4.83V
8	1.75V	152V	2.4V	0V	-	3.7V
9		156V	0V	3.9V	-	3.7V
10			0V	3.9V	-	-
11			2.4V	3.9V	12V	-
12			0V	3.9V	0.5Vpp	1.57V
13			0V	3.9V		0V
14			0V	3.9V		4.74V
15			2.3V	3V		-
16			2.3V	3V		1.75V
17			1.6V	2.8V		
18			4.7V	3.9V		
19			0V	3.9V		
20			2.4V	3.9V		
21			2.6V	3.9V		
22			2.4V	3.9V		
23			2.4V	3.9V		
24			0V	3.9V		
25			2.4V	0V		
26			5V	-		
27			2.4V	3.9V		
28			2.4V	-		
29			2.4V	3.9V		
30			2.3V	-		
31			2.4V	-		
32			1.3V			
33			2.4V			
34			2.3V			
35			2.4V			
36			4.8V			
37			0V			
38			4.7V			
39			0V			
40			3.4V			
41			2.4V			
42			0V			
43			2.4V			
44			0V			
45			2.3V			
46			4.7V			
47			4.6V			
48			2.5V			
49			2.9V			
50			2.5V			
51			4.7V			
52			4.7V			

* All voltages are in Volt
* Reading are taken with a digital multimeter.
* Reading are taken with a colour-bar signal input.

* Sound min.
  Contrast
  Brightness } Normal
  Color

CHASSIS REPLACEMENT PART LIST

POS.	NO	DESCRIPTION	BOARD	FUNCTION
C472	619005064741	CAP. M.K.T.470N 63V %10	MAIN	16:9 FORMAT
Q500	046246022281	TRS.BC547B	MAIN	16:9 FORMAT
R529	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	16:9 FORMAT
R530	030140639301	RES.CAR.FILM 39K 1/6W %5	MAIN	16:9 FORMAT
R591	030140615121	RES.CAR.FILM 150R 1/6W %5	MAIN	16:9 FORMAT
C101	621003054741	CAP. M.K.T.470N 250V %10 22.5M	MAIN	BASIC
C102	621005051041	CAP. M.K.P.100N 250V AC %20	MAIN	BASIC
C103	040040152211	CAP.CER. 2.2N 1KV %10	MAIN	BASIC
C104	040040152211	CAP.CER. 2.2N 1KV %10	MAIN	BASIC
C105	042719901071	CAP. ELECT. 100M 400V %20	MAIN	BASIC
C106	621003133331	CAP.POLY. 33N 630V %5	MAIN	BASIC
C107	040040171021	CAP.CER. 1N 2KV %10 BN	MAIN	BASIC
C109	042416501051	CAP. ELECT. 1M 50V %20 RS	MAIN	BASIC
C110	621004003321	CAP.POLY. 3.3N 50V %10	MAIN	BASIC
C111	618014006821	CAP.POLY. 6.8N 50V %10	MAIN	BASIC
C112	042447164761	CAP. ELECT. 47M 16V %20	MAIN	BASIC
C113	621004002241	CAP. M.K.T.220N 50V %10	MAIN	BASIC
C115	040050151011	CAP.CER. 100P 1KV %20 BN	MAIN	BASIC
C116	040040202221	CAP.CER. 2.2N 4KV %10 MX SAFETY	MAIN	BASIC
C120	040046151021	CAP.CER. 1N 1KV %10 BN	MAIN	BASIC
C121	042440631081	CAP. ELECT. 1000MF 63V %20	MAIN	BASIC
C122	040046151021	CAP.CER. 1N 1KV %10 BN	MAIN	BASIC
C123	042449254771	CAP. ELECT. 470M 25V %20	MAIN	BASIC
C124	040040154711	CAP.CER. 470P 1KV %10 B	MAIN	BASIC
C134	040070041031	CAP.CER. 10N 50V %80-20 F	MAIN	BASIC
C138	042416502261	CAP. ELECT. 22M 50V %20 RS	MAIN	BASIC
C136	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C137	042414251071	CAP. ELECT. 100M 25V %20	MAIN	BASIC
C139	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C140	042417162271	CAP. ELECT. 220M 16V %20	MAIN	BASIC
C141	042447164761	CAP. ELECT. 47M 16V %20	MAIN	BASIC
C142	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C143	042412250471	CAP. ELECT. 47M 250V %20	MAIN	BASIC
C144	040040154711	CAP.CER. 470P 1KV %10 B	MAIN	BASIC
C145	042447164761	CAP. ELECT. 47M 16V %20	MAIN	BASIC
C146	042447164761	CAP. ELECT. 47M 16V %20	MAIN	BASIC
C150	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C151	042449252271	CAP. ELECT. 220M 25V %20	MAIN	BASIC
C152	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C243	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C244	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C245	040070041021	CAP.CER. 1N 50V %80-20 F	MAIN	BASIC
C246	040070041021	CAP.CER. 1N 50V %80-20 F	MAIN	BASIC
C248	042140161071	CAP. ELECT. 100M 16V %20 RS	MAIN	BASIC
C255	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C276	620004083341	CAP. M.K.T.330N 63V %5	MAIN	BASIC
C277	620004071041	CAP. M.K.T.100N 63V %10	MAIN	BASIC
C278	621003003341	CAP. M.K.P.330N 50V %5	MAIN	BASIC
C279	618013002231	CAP. ELECT. 22N 50V %5	MAIN	BASIC
C280	618013002231	CAP. ELECT. 22N 50V %5	MAIN	BASIC
C281	618013002231	CAP. ELECT. 22N 50V %5	MAIN	BASIC
C282	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C283	042446161061	CAP. ELECT. 10M 16V %20	MAIN	BASIC
C284	042417163361	CAP. ELECT. 33M 16V %20	MAIN	BASIC
C285	042446161061	CAP. ELECT. 10M 16V %20	MAIN	BASIC
C286	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C301	040034041201	CAP.CER. 12P 50V %5 CH	MAIN	BASIC
C305	040070041021	CAP.CER. 1N 50V %80-20 F	MAIN	BASIC
C306	042446164751	CAP. ELECT. 4.7M 16V %20	MAIN	BASIC
C308	042446161061	CAP. ELECT. 10M 16V %20	MAIN	BASIC
C309	042446161061	CAP. ELECT. 10M 16V %20	MAIN	BASIC
C310	620013081041	CAP. M.K.T.100N 63V %5	MAIN	BASIC

POS.	NO	DESCRIPTION	BOARD	FUNCTION
C315	620013081041	CAP. M.K.T.100N 63V %5	MAIN	BASIC
C317	620013081041	CAP. M.K.T.100N 63V %5	MAIN	BASIC
C318	620013081041	CAP. M.K.T.100N 63V %5	MAIN	BASIC
C319	620013081041	CAP. M.K.T.100N 63V %5	MAIN	BASIC
C320	618004001031	CAP.POLY. 10N 50V %10	MAIN	BASIC
C325	618024074701	CAP.POLY. 4.7N 63V %10	MAIN	BASIC
C326	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C327	040032041801	CAP.CER. 18P 50V %5 CH	MAIN	BASIC
C328	042416161051	CAP. ELECT. 1M 16V %20	MAIN	BASIC
C329	040070041031	CAP.CER. 10N 50V %80-20 F	MAIN	BASIC
C331	040070041031	CAP.CER. 10N 50V %80-20 F	MAIN	BASIC
C332	618024004721	CAP.POLY. 4.7N 50V %10	MAIN	BASIC
C333	042416161051	CAP. ELECT. 1M 16V %20	MAIN	BASIC
C334	618014002221	CAP.POLY. 2.2N 50V %10	MAIN	BASIC
C335	620013081041	CAP. M.K.T.100N 63V %5	MAIN	BASIC
C336	040067044721	CAP.CER. 4.7N 50V %20	MAIN	BASIC
C337	042414162251	CAP. ELECT. 2.2M 16V %20	MAIN	BASIC
C338	620013081041	CAP. M.K.T.100N 63V %5	MAIN	BASIC
C339	040070042231	CAP.CER. 22N 50V %20-80	MAIN	BASIC
C340	621004002241	CAP. M.K.T.220N 50V %10	MAIN	BASIC
C341	042446161061	CAP. ELECT. 10M 16V %20	MAIN	BASIC
C342	042414162251	CAP. ELECT. 2.2M 16V %20	MAIN	BASIC
C343	040070042231	CAP.CER. 22N 50V %20-80	MAIN	BASIC
C344	042446164751	CAP. ELECT. 4.7M 16V %20	MAIN	BASIC
C345	040032041001	CAP.CER. 10P 50V %5 CH	MAIN	BASIC
C346	040040041011	CAP.CER. 100P 50V %10 SL	MAIN	BASIC
C348	040040041011	CAP.CER. 100P 50V %10 SL	MAIN	BASIC
C431	040070041021	CAP.CER. 1N 50V %80-20 F	MAIN	BASIC
C432	042440251081	CAP. ELECT. 1000M 25V %20 RS	MAIN	BASIC
C433	042440631081	CAP. ELECT. 1000MF 50V %20	MAIN	BASIC
C434	042140161071	CAP. ELECT. 100M 16V %20 RS	MAIN	BASIC
C436	040070041031	CAP.CER. 10N 50V %80-20 F	MAIN	BASIC
C438	040067041031	CAP.CER. 100N 50V %20	MAIN	BASIC
C450	040032041801	CAP.CER. 18P 50V %5 CH	MAIN	BASIC
C452	042446161061	CAP. ELECT. 10M 16V %20	MAIN	BASIC
C453	042414162251	CAP. ELECT. 2.2M 16V %20	MAIN	BASIC
C454	042446161061	CAP. ELECT. 10M 16V %20	MAIN	BASIC
C455	040070041031	CAP.CER. 10N 50V %80-20	MAIN	BASIC
C456	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C457	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C458	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C459	040040032211	CAP.CER. 220P 50V %10 B	MAIN	BASIC
C460	040032041801	CAP.CER. 18P 50V %5 CH	MAIN	BASIC
C461	040032041801	CAP.CER. 18P 50V %5 CH	MAIN	BASIC
C462	620013081041	CAP. M.K.T.100N 63V %5	MAIN	BASIC
C463	040040032211	CAP.CER. 220P 50V %10 SL	MAIN	BASIC
C464	042140161071	CAP. ELECT. 100M 16V %20 RS	MAIN	BASIC
C465	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C468	040040032211	CAP.CER. 220P 50V %10 B	MAIN	BASIC
C471	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	BASIC
C576	040030014031	CAP.CER. 10N 50V %10	MAIN	BASIC
C577	040040041021	CAP.CER. 1N 50V %10 B	MAIN	BASIC
C578	040140044711	CAP.CER. 470P 50V %10 B	MAIN	BASIC
C579	042448504761	CAP. ELECT. 47M 50V %20 RS	MAIN	BASIC
C580	040070042231	CAP.CER. 22N 50V %20-80	MAIN	BASIC
C581	042414504771	CAP. ELECT. 470M 50V %20	MAIN	BASIC
C582	042416501051	CAP. ELECT. 1M 50V %20 RS	MAIN	BASIC
C583	042414351081	CAP. ELECT. 2200M 35V %20	MAIN	BASIC
C584	621004001041	CAP. M.K.T.100N 50V %10	MAIN	BASIC
C585	621004001041	CAP. M.K.T.100N 50V %10	MAIN	BASIC
C586	040040041021	CAP.CER. 1N 50V %10 B	MAIN	BASIC
C587	042416351081	CAP. ELECT. 1000M 35V %20 RSS	MAIN	BASIC

POS.	NO	DESCRIPTION	BOARD	FUNCTION
C592	620004036841	CAP. M.K.P.680N 250V %10	MAIN	BASIC
C593	040071042221	CAP.CER. 2.2N 50V %80-20 F	MAIN	BASIC
C594	040040174711	CAP.CER. 470P 2KV %10 BN	MAIN	BASIC
C596	621003121011	CAP. M.K.P.10N 1.6KV %5	MAIN	BASIC
C597	618003042231	CAP. M.K.P. 22NF 400V 5%	MAIN	BASIC
C598	040040171021	CAP.CER. 1N 2KV %10 BN	MAIN	BASIC
C599	040040172221	CAP.CER. 2.2N 2KV %10	MAIN	BASIC
C600	042446862251	CAP. ELECT. 2.2M 250V %20	MAIN	BASIC
C601	040040156811	CAP.CER. 680P 1KV %10 BN	MAIN	BASIC
C602	042440861061	CAP. ELECT. 10M 250V %20	MAIN	BASIC
C603	040046151021	CAP.CER. 1N 1KV %10 BN	MAIN	BASIC
C605	620004071041	CAP. M.K.T.100N 63V %10	MAIN	BASIC
C606	042412250471	CAP. ELECT. 47M 250V %20	MAIN	BASIC
C608	040052042211	CAP.CER. 220P 50V %20	MAIN	BASIC
C609	040040152211	CAP.CER. 2.2N 1KV %10	MAIN	BASIC
C610	620004014731	CAP. M.K.T. 47N 100V %10	MAIN	BASIC
C620	620004036841	CAP. M.K.P.680N 250V %10	MAIN	BASIC
D101	048320915221	DIODE BRIDGE 1.2A 600V	MAIN	BASIC
D102	048000000021	DIODE BYV95C	MAIN	BASIC
D104	048000000011	DIODE BYD33D	MAIN	BASIC
D105	048000000011	DIODE BYD33D	MAIN	BASIC
D120	048000000021	DIODE BYV95C	MAIN	BASIC
D121	048000000021	DIODE BYV95C	MAIN	BASIC
D122	048000000021	DIODE BYV95C	MAIN	BASIC
D124	048540733021	DIODE ZTK33B	MAIN	BASIC
D125	048000000021	DIODE BYV95C	MAIN	BASIC
D305	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D391	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D452	048100255121	ZNR.DIODE 3.6V	MAIN	BASIC
D453	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D454	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D455	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D456	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D457	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D458	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D459	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D460	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D461	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D462	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D576	048321423201	DIODE 1N4007	MAIN	BASIC
D577	048990222221	DIODE BY 228	MAIN	BASIC
D578	048000000021	DIODE BYV95C	MAIN	BASIC
D579	048000000021	DIODE BYV95C	MAIN	BASIC
D580	048544926101	DIODE ZNR.ZPD. 7.5V	MAIN	BASIC
D581	048000000941	DIODE BYV26C	MAIN	BASIC
D582	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D583	048000000011	DIODE BYD33D	MAIN	BASIC
D584	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
D585	048210411001	DIODE 1N4148 AX.	MAIN	BASIC
F001	067310001821	FUSE 2A/250V	MAIN	BASIC
I001	045000000761	IC TDA4605	MAIN	BASIC
I002	045018113181	IC LM7808 8V 1A	MAIN	BASIC
I003	045238103051	IC LM317	MAIN	BASIC
I004	045238103081	IC LM7805 5V 1A	MAIN	BASIC
I102	045000001031	IC TDA4665	MAIN	BASIC
I301	045000001431	IC CTV811S V1.0-7(SAA5290)	MAIN	BASIC
I302	045000000811	IC PCF8594C-2P/02	MAIN	BASIC
I426	045100120331	IC TDA2616	MAIN	BASIC
I576	045000000831	IC TDA3654	MAIN	BASIC
L121	608380002361	COIL CHOKE 150UH %10PK0912151K	MAIN	BASIC
L202	608980000111	COIL 1UH J AX. FIXED	MAIN	BASIC
L205	608000000021	COIL 10UH J AX.FIX.TAPED	MAIN	BASIC

POS.	NO	DESCRIPTION	BOARD	FUNCTION
L206	608980000111	COIL 1UH J AX. FIXED	MAIN	BASIC
L207	608000000071	COIL 3.3UH J FIXED	MAIN	BASIC
L208	608000000071	COIL 3.3UH J FIXED	MAIN	BASIC
L209	608000000071	COIL 3.3UH J FIXED	MAIN	BASIC
L300	608000000021	COIL 10UH J AX.FIX.TAPED	MAIN	BASIC
L302	608080000161	COIL 6.8UH J AX.FIX TAPED	MAIN	BASIC
L304	608980000111	COIL 1UH J AX. FIXED	MAIN	BASIC
L601	608780002411	COIL FILTER 3.5*10*1.3 H	MAIN	BASIC
L676	608980004011	COIL LIN.LC110/92 (AT4042/92)	MAIN	BASIC
P101	611380015021	TRIMPOT 5K 1/2W %20 VERT SM1	MAIN	BASIC
P300	611380011031	TRIMPOT 10K 1/2W %20 VERT SM1	MAIN	BASIC
P301	611380011031	TRIMPOT 10K 1/2W %20 VERT SM1	MAIN	BASIC
P576	611380015011	TRIMPOT 500R 1/2W %20 VERT SM1	MAIN	BASIC
P579	611380015021	TRIMPOT 5K 1/2W %20 VERT SM1	MAIN	BASIC
PTC1	034710303631	POSISTOR PTH451A102BG180N29	MAIN	BASIC
Q101	046000000121	TRS.BUZ90A	MAIN	BASIC
Q123	046246022281	TRS.BC547B	MAIN	BASIC
Q276	046000022101	TRS.PH2369	MAIN	BASIC
Q300	046246022281	TRS.BC547B	MAIN	BASIC
Q301	046246022281	TRS.BC547B	MAIN	BASIC
Q450	046246022281	TRS.BC547B	MAIN	BASIC
Q452	046246022281	TRS.BC547B	MAIN	BASIC
Q453	046246022281	TRS.BC547B	MAIN	BASIC
Q454	046246022281	TRS.BC547B	MAIN	BASIC
Q455	046246022281	TRS.BC547B	MAIN	BASIC
Q458	046246022281	TRS.BC547B	MAIN	BASIC
Q459	046926267271	TRS.BC558	MAIN	BASIC
Q463	046246022281	TRS.BC547B	MAIN	BASIC
Q464	046246022281	TRS.BC547B	MAIN	BASIC
Q465	046926267271	TRS.BC558	MAIN	BASIC
Q466	046926267271	TRS.BC558	MAIN	BASIC
Q477	046926267271	TRS.BC558	MAIN	BASIC
Q580	046000000051	TRS.2SC1573A	MAIN	BASIC
Q602	046932183031	TRS.BUH515D 6A 1500V	MAIN	BASIC
R101	032057622941	RES. WIREWOUND 2.2R 5W %5	MAIN	BASIC
R102	030208668311	RES.M.O. 68K 2W %5	MAIN	BASIC
R103	030108647311	RES.M.O. 47K 1W %5	MAIN	BASIC
R105	030140622101	RES.CAR.FILM 220R 1/6W %5	MAIN	BASIC
R106	030140668201	RES.CAR.FILM 6.8K 1/6W %5	MAIN	BASIC
R107	030108668021	RES.M.O. 68R 1W %5	MAIN	BASIC
R108	030010627421	RES.M.O. 270K 1W %5	MAIN	BASIC
R109	030108668411	RES.M.O. 680K 1W %5	MAIN	BASIC
R110	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC
R111	030140647011	RES.CAR.FILM 47R 1/6W %5	MAIN	BASIC
R112	030140650911	RES.CAR.FILM 5.1R 1/6W %5	MAIN	BASIC
R114	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R115	030050647511	RES.CAR.FILM 4.7M 1/2W %5 SAFETY	MAIN	BASIC
R120	030105647811	RES. FUSIBLE 0.47R 1W %5	MAIN	BASIC
R121	030105647811	RES. FUSIBLE 0.47R 1W %5	MAIN	BASIC
R122	030105647811	RES. FUSIBLE 0.47R 1W %5	MAIN	BASIC
R124	030108712311	RES.M.O. 12K 1W %5	MAIN	BASIC
R126	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC
R127	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R128	030105622811	RES. FUSIBLE 0.22R 1W %5	MAIN	BASIC
R130	030108647311	RES.M.O. 47K 1W %5	MAIN	BASIC
R131	030140639111	RES.CAR.FILM 390R 1/6W %5	MAIN	BASIC
R132	030140633201	RES.CAR.FILM 3.3K 1/6W %5	MAIN	BASIC
R133	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R134	030105633811	RES. FUSIBLE 0.33R 1W %5	MAIN	BASIC
R136	032050733961	RES. WIREWOUND 3.3R 5W %10	MAIN	BASIC
R152	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R153	030140668201	RES.CAR.FILM 6.8K 1/6W %5	MAIN	BASIC

POS.	NO	DESCRIPTION	BOARD	FUNCTION
R241	030140622901	RES.CAR.FILM 2.2R 1/6W %5 NON-FLAMABLE	MAIN	BASIC
R242	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	BASIC
R289	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC
R290	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R291	030140633301	RES.CAR.FILM 33K 1/6W %5	MAIN	BASIC
R293	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	BASIC
R294	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	BASIC
R295	030140656211	RES.CAR.FILM 5.6K 1/6W %5	MAIN	BASIC
R296	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R297	030140612311	RES.CAR.FILM 12K 1/6W %5	MAIN	BASIC
R298	030140622511	RES.CAR.FILM 2.2M 1/6W %5	MAIN	BASIC
R299	030140633201	RES.CAR.FILM 3.3K 1/6W %5	MAIN	BASIC
R300	030140639111	RES.CAR.FILM 390R 1/6W %5	MAIN	BASIC
R301	030140656211	RES.CAR.FILM 5.6K 1/6W %5	MAIN	BASIC
R303	030140610411	RES.CAR.FILM 100K 1/6W %5	MAIN	BASIC
R304	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	BASIC
R307	030140612121	RES.CAR.FILM 120R 1/6W %5	MAIN	BASIC
R308	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R310	030140618121	RES.CAR.FILM 180R 1/6W %5	MAIN	BASIC
R312	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R313	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R315	030140622221	RES.CAR.FILM 2.2K 1/6W %5	MAIN	BASIC
R320	030140647311	RES.CAR.FILM 47K 1/6W %5	MAIN	BASIC
R322	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	BASIC
R323	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R324	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R325	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R332	030140610411	RES.CAR.FILM 100K 1/6W %5	MAIN	BASIC
R333	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R334	030140647921	RES.CAR.FILM 4.7R 1/6W %5 NON-FLAMABLE	MAIN	BASIC
R335	030140647411	RES.CAR.FILM 470K 1/6W %5	MAIN	BASIC
R339	030140612311	RES.CAR.FILM 12K 1/6W %5	MAIN	BASIC
R340	030140633511	RES.M.F. 3.3M 1/6W %5	MAIN	BASIC
R341	030140610411	RES.CAR.FILM 100K 1/6W %5	MAIN	BASIC
R342	030140656211	RES.CAR.FILM 5.6K 1/6W %5	MAIN	BASIC
R343	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	BASIC
R408	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R432	030050647811	RES.CAR.FILM 0.47R 1/2W %5	MAIN	BASIC
R433	030050647811	RES.CAR.FILM 0.47R 1/2W %5	MAIN	BASIC
R447	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R448	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R450	030140633201	RES.CAR.FILM 3.3K 1/6W %5	MAIN	BASIC
R453	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R454	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R456	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC
R458	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	BASIC
R460	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R461	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R462	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R463	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R464	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	BASIC
R465	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R466	030140647311	RES.CAR.FILM 47K 1/6W %5	MAIN	BASIC
R467	030140627311	RES.CAR.FILM 27K 1/6W %5	MAIN	BASIC
R469	030140622221	RES.CAR.FILM 2.2K 1/6W %5	MAIN	BASIC
R470	030140682321	RES.CAR.FILM 82K 1/6W %5	MAIN	BASIC
R471	030140639301	RES.CAR.FILM 39K 1/6W %5	MAIN	BASIC
R472	030140656311	RES.CAR.FILM 56K 1/6W %5	MAIN	BASIC
R473	030140656311	RES.CAR.FILM 56K 1/6W %5	MAIN	BASIC
R474	030140615311	RES.CAR.FILM 15K 1/6W %5	MAIN	BASIC
R476	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	BASIC
R479	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC

POS.	NO	DESCRIPTION	BOARD	FUNCTION
R480	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC
R481	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R482	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R484	030140656211	RES.CAR.FILM 5.6K 1/6W %5	MAIN	BASIC
R485	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	BASIC
R486	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	BASIC
R487	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	BASIC
R488	030140639111	RES.CAR.FILM 390R 1/6W %5	MAIN	BASIC
R490	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	BASIC
R491	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	BASIC
R492	030140633101	RES.CAR.FILM 330R 1/6W %5	MAIN	BASIC
R493	030140633101	RES.CAR.FILM 330R 1/6W %5	MAIN	BASIC
R494	030140633101	RES.CAR.FILM 330R 1/6W %5	MAIN	BASIC
R495	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R496	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R497	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R498	030140647311	RES.CAR.FILM 47K 1/6W %5	MAIN	BASIC
R499	030020656131	RES.CAR.FILM 560R 1/4W %5	MAIN	BASIC
R500	030140633011	RES.CAR.FILM 33R 1/6W %5	MAIN	BASIC
R501	030140682211	RES.CAR.FILM 8.2K 1/6W %5	MAIN	BASIC
R502	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	BASIC
R503	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R504	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R506	030140622101	RES.CAR.FILM 220R 1/6W %5	MAIN	BASIC
R507	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	BASIC
R508	030140627311	RES.CAR.FILM 27K 1/6W %5	MAIN	BASIC
R509	030140627311	RES.CAR.FILM 27K 1/6W %5	MAIN	BASIC
R510	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	BASIC
R511	030140627311	RES.CAR.FILM 27K 1/6W %5	MAIN	BASIC
R520	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R521	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC
R525	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC
R526	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R527	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R528	030140612121	RES.CAR.FILM 120R 1/6W %5	MAIN	BASIC
R548	030140647311	RES.CAR.FILM 47K 1/6W %5	MAIN	BASIC
R576	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC
R577	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC
R578	030050622111	RES.CAR.FILM 220R 1/2W %5	MAIN	BASIC
R579	030140615311	RES.CAR.FILM 15K 1/6W %5	MAIN	BASIC
R580	030140618121	RES.CAR.FILM 180R 1/6W %5	MAIN	BASIC
R581	030140656311	RES.CAR.FILM 56K 1/6W %5	MAIN	BASIC
R582	030020615331	RES.CAR.FILM 15K 1/4W %5	MAIN	BASIC
R583	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	BASIC
R584	030108610911	RES.M.O. 1R 1W %5	MAIN	BASIC
R585	030058615111	RES.M.O. 150R 1/2W %5	MAIN	BASIC
R586	030059656111	RES.M.O. 560R 1/2W %5 NON-FLAMABLE	MAIN	BASIC
R588	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC
R589	030108610911	RES.M.O. 1R 1W %5	MAIN	BASIC
R590	030059656111	RES.M.O. 560R 1/2W %5 NON-FLAMABLE	MAIN	BASIC
R601	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	BASIC
R602	030140622101	RES.CAR.FILM 220R 1/6W %5	MAIN	BASIC
R605	030218610211	RES.M.O. 1K 3W %5	MAIN	BASIC
R608	030208610311	RES.M.O. 10K 2W %5	MAIN	BASIC
R609	032054620211	RES. WIREWOUND 2K 5W %5	MAIN	BASIC
R610	030108610911	RES.M.O. 1R 1W %5	MAIN	BASIC
R611	032107739901	RES. WIREWOUND 3.9R 10W %10	MAIN	BASIC
R612	030140627211	RES.CAR.FILM 2.7K 1/6W %5	MAIN	BASIC
R613	030105647811	RES. FUSIBLE 0.47R 1W %5	MAIN	BASIC
R614	030055722811	RES. FUSIBLE 0.22R 1/2W %5	MAIN	BASIC
R615	030055722811	RES. FUSIBLE 0.22R 1/2W %5	MAIN	BASIC
R617	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	BASIC

POS.	NO	DESCRIPTION	BOARD	FUNCTION
R618	030020615331	RES.CAR.FILM 15K 1/4W %5	MAIN	BASIC
R619	030140639021	RES.CAR.FILM 39R 1/2W %5	MAIN	BASIC
R620	030140627311	RES.CAR.FILM 27K 1/6W %5	MAIN	BASIC
R621	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	BASIC
R690	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	BASIC
S102	075100211021	CONN.2P 5285-02A MAINS	MAIN	BASIC
S106	075100211781	CONN.2P 5287-02A DEG.	MAIN	BASIC
S300	075030411001	CONN.4P MALE SM1	MAIN	BASIC
S301	075030511001	CONN.5P MALE SM1	MAIN	BASIC
S303	075100311580	CONN.3P MALE-LOCK SM1	MAIN	BASIC
S400	075030411001	CONN.4P MALE SM1	MAIN	BASIC
S401	075100411000	CONN.4P TMK2004 MALE-LOCK.	MAIN	BASIC
S580	075030261001	CONN.2P 5283-02A HRZ.	MAIN	BASIC
S581	075030211001	CONN.2P 5279-02A VERT.	MAIN	BASIC
S603	075030411011	CONN.4P(3P) MALE SM1	MAIN	BASIC
S800	075100311580	CONN.3P MALE-LOCK SM1	MAIN	BASIC
T300	608280001601	COIL TOKO 38.9MHZ	MAIN	BASIC
T601	602300033051	TRF.HRZ.DRIVE (AT-ETH-20Y20BY)	MAIN	BASIC
T602	604200000271	TRF. FBT 25" SM-1	MAIN	BASIC
TR01	608980003721	FILTER LINE 2*74MH ELF-18D615	MAIN	BASIC
X300	049030000501	CRYSTAL 4.43 MHZ	MAIN	BASIC
X450	049030000091	CRYSTAL 12.000 MHZ	MAIN	BASIC
	608580004070	COIL DEGAUSSING 28' CPT(72T)	MAIN	BASIC
	610316120011	SPEAKER 16R 12W 158/57 MM	MAIN	BASIC
	610316120011	SPEAKER 16R 12W 158/57 MM	MAIN	BASIC
	002021000301	CABLE 2P*1SKT.35CM S/B DEG.SGS	MAIN	BASIC
	002344500021	CABLE 2P*1SKT.40CM BROWN/BLACK	MAIN	BASIC
	002344500031	CABLE 2P*1SKT.40CM RED/WHITE	MAIN	BASIC
	002099502710	CABLE 2P*1SKT.50CM SPEAKER-TWEETER	MAIN	BASIC
	002099502001	CABLE 2P*1SKT.70CM BROWN/BLUE	MAIN	BASIC
	002033200300	CABLE 3P*1SKT.40CMPRE.28SM1YPT	MAIN	BASIC
	002032000001	CABLE 3P.2SKT.(S)24CM SM 1	MAIN	BASIC
	002032000001	CABLE 3P.2SKT.(S)24CM SM 1	MAIN	BASIC
	002421512100	CABLE 4P*1SKT.40CM PRG.VOL.YPT	MAIN	BASIC
	002041100710	CABLE 4P*1SKT.75CM	MAIN	BASIC
	002042000041	CABLE 4P.2SKT.24CM SM 1	MAIN	BASIC
	002528554031	CABLE POWER 2*500UH 230CM	MAIN	BASIC
	075100211050	SOCKET 2P DISI GRI	MAIN	BASIC
	602470003390	TRF.SMPS 25"-28" 30V SM-1	MAIN	BASIC
	610206610241	TWEETER 16R 5W	MAIN	BASIC
	610206610241	TWEETER 16R 5W	MAIN	BASIC
F303	037730007071	FILTER SER.5.5MHZ TPS 5.5MB	MAIN	BG
R319	030140612311	RES.CAR.FILM 12K 1/6W %5	MAIN	BG
F305	037730007901	FILTER SAW K-2955M (38.9MHZ)	MAIN	BG , D/K
C001	042446164751	CAP. ELECT. 4.7M 16V %20	CONT.	CONT.
R001	030140610101	RES.CAR.FILM 100R 1/6W %5	CONT.	CONT.
R002	030140610201	RES.CAR.FILM 1K 1/6W %5	CONT.	CONT.
R003	030140612311	RES.CAR.FILM 12K 1/6W %5	CONT.	CONT.
	048773809001	DIODE LED DKLR114E	CONT.	CONT.
	609330001131	PREAMFI TFK-1360	CONT.	CONT.
	081101111601	TACT SWITCH VERTICAL ACTION	CONT.	CONT.
	081101111601	TACT SWITCH VERTICAL ACTION	CONT.	CONT.
	081101111601	TACT SWITCH VERTICAL ACTION	CONT.	CONT.
	081101111601	TACT SWITCH VERTICAL ACTION	CONT.	CONT.
C001	618003201021	CAP.M.K.P. 1NF 2KV %5	CRT	CRT
C002	040040500271	CAP.CER. 2.7NF 500V %10	CRT	CRT
C003	620003051041	CAP.M.K.T. 100NF 250V %10	CRT	CRT
C004	042440861061	CAP. ELECT. 10MF 250V %20 RADIAL	CRT	CRT
C005	042446862251	CAP. ELECT. 2.2M 250V %20	CRT	CRT
D001	048113229041	DIODE BAV21	CRT	CRT
D002	048113229041	DIODE BAV21	CRT	CRT
D003	048113229041	DIODE BAV21	CRT	CRT

POS.	NO	DESCRIPTION	BOARD	FUNCTION
D004	048321423201	DIODE 1N4007	CRT	CRT
I001	045000001461	IC TDA6107Q-N1	CRT	CRT
P001	611180012021	TRIMPOT 2K 1/2W %20 HORZ SM1	CRT	CRT
P002	611180012021	TRIMPOT 2K 1/2W %20 HORZ SM1	CRT	CRT
R002	030108615211	RES.M.O. 1.5K 1W %5	CRT	CRT
R003	030050610211	RES.CAR.FILM 1K 1/2W %5	CRT	CRT
R004	030050610211	RES.CAR.FILM 1K 1/2W %5	CRT	CRT
R005	030050610211	RES.CAR.FILM 1K 1/2W %5	CRT	CRT
R006	030020647001	RES.M.O. 47R 1/4W %5	CRT	CRT
R007	030108615211	RES.M.O. 1.5K 1W %5	CRT	CRT
R008	030020610131	RES.CAR.FILM 100R 1/4W %5	CRT	CRT
R009	030020610131	RES.CAR.FILM 100R 1/4W %5	CRT	CRT
R010	030020610131	RES.CAR.FILM 100R 1/4W %5	CRT	CRT
R011	030020610131	RES.CAR.FILM 100R 1/4W %5	CRT	CRT
R012	030020615231	RES.CAR.FILM 1.5K 1/4W %5	CRT	CRT
R013	030020622511	RES.CAR.FILM 2.2M 1/4W %5	CRT	CRT
S001	075030511001	CONN.5P MALE SM1	CRT	CRT
S002	075030411011	CONN.4P(3P) MALE SM1	CRT	CRT
	075020800031	SOCKET CRT(K-HPS0359-01-140)29M	CRT	CRT
	002042000031	CABLE 4P(3P)*2SKT.38CM SM1	MAIN	CRT
	002052000401	CABLE 5P*2SKT.38CM SM1	MAIN	CRT
C758	042140161071	CAP. ELECT. 100M 16V %20 RS	MAIN	D.SCART
C759	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	D.SCART
I701	045000001121	IC 74HC4053	MAIN	D.SCART
Q757	046246022281	TRS.BC547B	MAIN	D.SCART
R775	030140647111	RES.CAR.FILM 470R 1/6W %5	MAIN	D.SCART
R777	030140647111	RES.CAR.FILM 470R 1/6W %5	MAIN	D.SCART
R784	030140647311	RES.CAR.FILM 47K 1/6W %5	MAIN	D.SCART
R785	030140610911	RES.CAR.FILM 1R 1/6W %5 NON-FLAMABLE	MAIN	D.SCART
R786	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	D.SCART
R787	030140647011	RES.CAR.FILM 47R 1/6W %5	MAIN	D.SCART
R788	030140622101	RES.CAR.FILM 220R 1/6W %5	MAIN	D.SCART
R792	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	D.SCART
R793	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	D.SCART
SC02	075040210050	SCART SOCKET	MAIN	D.SCART
C314	040040041011	CAP.CER. 100P 50V %10 SL	MAIN	D/K
F302	049030000531	FILTER SER.6.5MHZ.SFE6.5MB	MAIN	D/K
F304	037730007081	FILTER SER.TPS 6.5MB	MAIN	D/K
R309	030140633101	RES.CAR.FILM 330R 1/6W %5	MAIN	D/K
C548	040067041031	CAP.CER. 100N 50V %20	E-W	E-W
C595	620004001021	CAP.POLY. 1N 50V %10	E-W	E-W
C596	618004001031	CAP.POLY. 10N 50V %10	E-W	E-W
C597	620004003331	CAP.CER. 33N 50V %10	E-W	E-W
C599	040067044721	CAP.CER. 4.7N 50V %20 D	E-W	E-W
C600	042448504761	CAP. ELECT. 47M 50V %20 RS	E-W	E-W
D574	048544936121	DIODE ZNR. 1N5363B 30V 1.3W	E-W	E-W
D575	048210411001	DIODE 1N4148 AX.	E-W	E-W
I600	045000000941	IC TDA8145	E-W	E-W
P580	611380031041	TRIMPOT 100K 1/2W %20 VERT.	E-W	E-W
P581	611380011021	TRIMPOT 1K 1/2W %20 VERT SM1	E-W	E-W
R710	030140633011	RES.CAR.FILM 33R 1/6W %5	E-W	E-W
R711	030050633921	RES.CAR.FILM 3.3R 1/2W %5	E-W	E-W
R713	030140647211	RES.CAR.FILM 4.7K 1/6W %5	E-W	E-W
R714	030140618311	RES.CAR.FILM 18K 1/6W %5	E-W	E-W
R715	030140610101	RES.CAR.FILM 100R 1/6W %5	E-W	E-W
R717	030140622311	RES.CAR.FILM 22K 1/6W %5	E-W	E-W
R722	030140612311	RES.CAR.FILM 12K 1/6W %5	E-W	E-W
R724	030140647111	RES.CAR.FILM 470R 1/6W %5	E-W	E-W
S575	075030710871	CONN.7P B TO B FEMALE	E-W	E-W
L670	608380000330	COIL 1 MH E/W COR.	MAIN	E-W
L679	608380000320	COIL 10 mH E/W COR.	MAIN	E-W
S500	075100711000	CONN.7P TMK2007 MALE-LOCK	MAIN	E-W

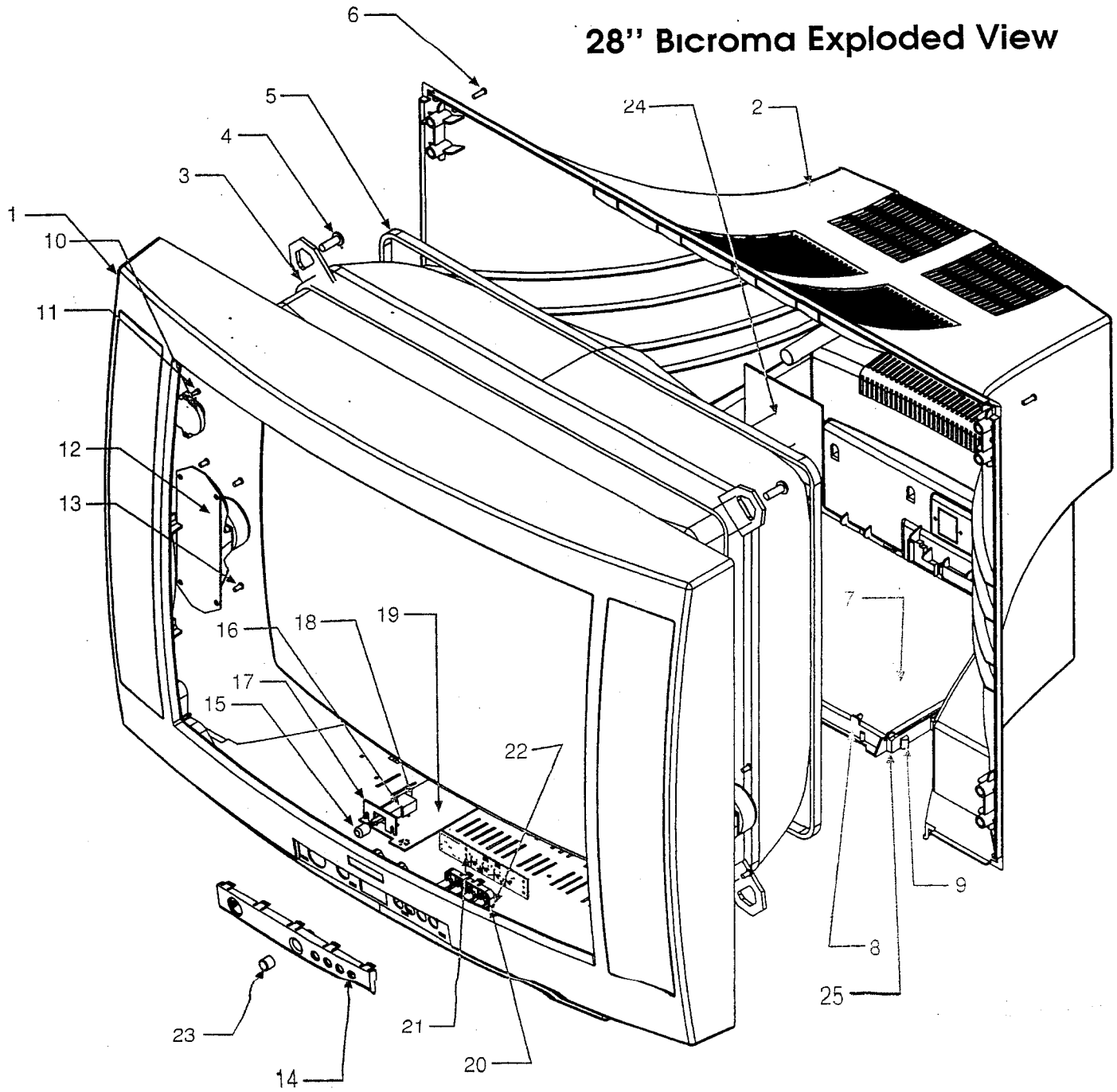
POS.	NO	DESCRIPTION	BOARD	FUNCTION
C900	040070042231	CAP.CER. 22N 50V %20-80	G.STEREO	G.STEREO
C901	040070042231	CAP.CER. 22N 50V %20-80	G.STEREO	G.STEREO
C902	040070021021	CAP.CER. 1N 25V %80-20 F	G.STEREO	G.STEREO
C903	040070021031	CAP.CER. 100N 25V %80-20 F	G.STEREO	G.STEREO
C904	042446161061	CAP. ELECT. 10M 16V %20	G.STEREO	G.STEREO
C906	040040044701	CAP.CER. 47P 50V %10 CH	G.STEREO	G.STEREO
C908	042447164761	CAP. ELECT. 47M 16V %20	G.STEREO	G.STEREO
C909	040070021031	CAP.CER. 100N 25V %80-20 F	G.STEREO	G.STEREO
C910	618004001031	CAP.POLY. 10N 50V %10	G.STEREO	G.STEREO
C911	618004001031	CAP.POLY. 10N 50V %10	G.STEREO	G.STEREO
C914	042446161061	CAP. ELECT. 10M 16V %20	G.STEREO	G.STEREO
C915	040070251031	CAP.CER. 10N 25V %80-20	G.STEREO	G.STEREO
C916	040070021031	CAP.CER. 100N 25V %80-20 F	G.STEREO	G.STEREO
C917	040070021021	CAP.CER. 1N 25V %80-20 F	G.STEREO	G.STEREO
C918	619202003611	CAP.STROF.3.6N 50V %2	G.STEREO	G.STEREO
C919	042417162271	CAP. ELECT. 220M 16V %20	G.STEREO	G.STEREO
C920	042416161051	CAP. ELECT. 1M 16V %20	G.STEREO	G.STEREO
C921	042416161051	CAP. ELECT. 1M 16V %20	G.STEREO	G.STEREO
C946	040070041031	CAP.CER. 10N 50V %80-20 F	G.STEREO	G.STEREO
C949	040040043321	CAP.CER. 3.3N 50V %10	G.STEREO	G.STEREO
C950	620004001041	CAP. M.K.T.100N 50V %10	G.STEREO	G.STEREO
F902	037730008231	FILTER SER.SFT-5.74MA	G.STEREO	G.STEREO
I900	045100080301	IC TBA120U	G.STEREO	G.STEREO
I901	045000000751	IC TDA9840	G.STEREO	G.STEREO
L101	608280001611	COIL TOKO 5.7MHZ	G.STEREO	G.STEREO
L900	608080000191	COIL 8.2UH J AX.	G.STEREO	G.STEREO
L902	608280001931	COIL, TOKO 2.5 mH J	G.STEREO	G.STEREO
P901	611380011031	TRIMPOT 10K 1/2W %20 VERT SM1	G.STEREO	G.STEREO
R900	030140610201	RES.CAR.FILM 1K 1/6W %5	G.STEREO	G.STEREO
R903	030140610101	RES.CAR.FILM 100R 1/6W %5	G.STEREO	G.STEREO
R904	030140610101	RES.CAR.FILM 100R 1/6W %5	G.STEREO	G.STEREO
R905	030140610311	RES.CAR.FILM 10K 1/6W %5	G.STEREO	G.STEREO
R909	030140622221	RES.CAR.FILM 2.2K 1/6W %5	G.STEREO	G.STEREO
R910	030140633201	RES.CAR.FILM 3.3K 1/6W %5	G.STEREO	G.STEREO
R913	030140633201	RES.CAR.FILM 3.3K 1/6W %5	G.STEREO	G.STEREO
R914	030140622221	RES.CAR.FILM 2.2K 1/6W %5	G.STEREO	G.STEREO
R915	030140610911	RES.CAR.FILM 1R 1/6W %5 NON-FLAMABLE	G.STEREO	G.STEREO
R921	030140622221	RES.CAR.FILM 2.2K 1/6W %5	G.STEREO	G.STEREO
R922	030140627311	RES.CAR.FILM 27K 1/6W %5	G.STEREO	G.STEREO
R923	030140627211	RES.CAR.FILM 2.7K 1/6W %5	G.STEREO	G.STEREO
R924	030140647211	RES.CAR.FILM 4.7K 1/6W %5	G.STEREO	G.STEREO
X900	049030000151	CRYSTAL 10MHZ	G.STEREO	G.STEREO
C300	618014002221	CAP.POLY. 2.2N 50V %10	MAIN	G.STEREO
TU01	616680000471	SIEL TUNER E2787-04WSP	MAIN	HYPER-BAND
C300	618024004721	CAP.POLY. 4.7N 50V %10	MAIN	MONO
C451	042416161051	CAP. ELECT. 1M 16V %20	MAIN	MONO
C466	042416161051	CAP. ELECT. 1M 16V %20	MAIN	MONO
F300	037730008211	FILTER SER.SFE-5.5MB	MAIN	MONO
R306	030140656311	RES.CAR.FILM 56K 1/6W %5	MAIN	MONO
R449	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	MONO
R451	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	MONO
R478	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	MONO
S403	075030211011	CONN.2P MALE SM1	MAIN	MONO
C311	040040044701	CAP.CER. 47P 50V %10 CH	MAIN	MONO /G.STEREO
C313	040040044701	CAP.CER. 47P 50V %10 CH	MAIN	MONO /G.STEREO
L301	608080000191	COIL 8.2UH J AX.	MAIN	MONO /G.STEREO
R311	030140610101	RES.CAR.FILM 100R 1/6W %5	MAIN	MONO /G.STEREO
C300	040040043321	CAP.CER. 3.3N 50V %10	MAIN	NIC / A2+NIC. L
R319	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	NIC / A2+NIC. L
C802	040070021031	CAP.CER. 100N 25V %80-20 F	NICAM	NICAM
C803	042447164761	CAP. ELECT. 47M 16V %20	NICAM	NICAM
C804	042447164761	CAP. ELECT. 47M 16V %20	NICAM	NICAM

POS.	NO	DESCRIPTION	BOARD	FUNCTION
C805	040070021031	CAP.CER. 100N 25V %80-20 F	NICAM	NICAM
C806	042414162251	CAP. ELECT. 2.2M 16V %20	NICAM	NICAM
C807	040070021031	CAP.CER. 100N 25V %80-20 F	NICAM	NICAM
C808	042447164761	CAP. ELECT. 47M 16V %20	NICAM	NICAM
C809	042414162251	CAP. ELECT. 2.2M 16V %20	NICAM	NICAM
C810	040070021031	CAP.CER. 100N 25V %80-20 F	NICAM	NICAM
C811	621004004731	CAP.POLY. 47N 50V %10	NICAM	NICAM
C812	042446161061	CAP. ELECT. 10M 16V %20	NICAM	NICAM
C815	042140161071	CAP. ELECT. 100M 16V %20 RS	NICAM	NICAM
C817	619005064741	CAP. M.K.T.470N 63V %10	NICAM	NICAM
C818	040040041011	CAP.CER. 100P 50V %10 SL	NICAM	NICAM
C819	040040041011	CAP.CER. 100P 50V %10 SL	NICAM	NICAM
C822	620004083341	CAP. M.K.T.330N 63V %5	NICAM	NICAM
C823	618013002231	CAP.POLY. 22N 50V %5	NICAM	NICAM
C824	040040032211	CAP.CER. 220P 50V %10 B	NICAM	NICAM
C825	042446161061	CAP. ELECT. 10M 16V %20	NICAM	NICAM
C826	040070021031	CAP.CER. 100N 25V %80-20 F	NICAM	NICAM
C827	042416501051	CAP. ELECT. 1M 50V %20 RS	NICAM	NICAM
C828	040070021031	CAP.CER. 100N 25V %80-20 F	NICAM	NICAM
C829	042447164761	CAP. ELECT. 47M 16V %20	NICAM	NICAM
C831	042446161061	CAP. ELECT. 10M 16V %20	NICAM	NICAM
C832	042446161061	CAP. ELECT. 10M 16V %20	NICAM	NICAM
C833	040070021031	CAP.CER. 100N 25V %80-20 F	NICAM	NICAM
C834	040032041001	CAP.CER. 10P 50V %5 CH	NICAM	NICAM
C842	040070021031	CAP.CER. 100N 25V %80-20 F	NICAM	NICAM
C843	040070021031	CAP.CER. 100N 25V %80-20 F	NICAM	NICAM
C850	040070031031	CAP.CER. 10N 50V %20	NICAM	NICAM
C851	040070031031	CAP.CER. 10N 50V %20	NICAM	NICAM
C978	040032041011	CAP.CER. 100P 50V %5 CH	NICAM	NICAM
C979	040032041011	CAP.CER. 100P 50V %5 CH	NICAM	NICAM
C984	040071041041	CAP.CER. 100N 50V %80-20 (FZ)	NICAM	NICAM
D800	048210411001	DIODE 1N4148 AX.	NICAM	NICAM
D801	048000000191	DIODE BB405	NICAM	NICAM
I801	045000000841	IC SAA 7283 ZP	NICAM	NICAM
L800	608080000161	COIL 6.8UH J AX.FIX TAPED	NICAM	NICAM
Q800	046246022281	TRS.BC547B	NICAM	NICAM
Q801	046246022281	TRS.BC547B	NICAM	NICAM
R800	030140610011	RES.CAR.FILM 10R 1/6W %5	NICAM	NICAM
R801	030140618201	RES.CAR.FILM 1.8K 1/6W %5	NICAM	NICAM
R802	030140610911	RES.CAR.FILM 1R 1/6W %5 NON-FLAMABLE	NICAM	NICAM
R803	030140633301	RES.CAR.FILM 33K 1/6W %5	NICAM	NICAM
R804	030140610101	RES.CAR.FILM 100R 1/6W %5	NICAM	NICAM
R805	030140610101	RES.CAR.FILM 100R 1/6W %5	NICAM	NICAM
R806	030140668411	RES.CAR.FILM 680K 1/6W %5	NICAM	NICAM
R808	030140610411	RES.CAR.FILM 100K 1/6W %5	NICAM	NICAM
R809	030140622311	RES.CAR.FILM 22K 1/6W %5	NICAM	NICAM
R810	030140610911	RES.CAR.FILM 1R 1/6W %5 NON-FLAMABLE	NICAM	NICAM
R811	030140610311	RES.CAR.FILM 10K 1/6W %5	NICAM	NICAM
R812	030140610101	RES.CAR.FILM 100R 1/6W %5	NICAM	NICAM
R813	030140610201	RES.CAR.FILM 1K 1/6W %5	NICAM	NICAM
R814	030140622311	RES.CAR.FILM 22K 1/6W %5	NICAM	NICAM
R815	030140618121	RES.CAR.FILM 180R 1/6W %5	NICAM	NICAM
R816	030140622221	RES.CAR.FILM 2.2K 1/6W %5	NICAM	NICAM
R817	030140647311	RES.CAR.FILM 47K 1/6W %5	NICAM	NICAM
R818	030140647111	RES.CAR.FILM 470R 1/6W %5	NICAM	NICAM
R819	030140622311	RES.CAR.FILM 22K 1/6W %5	NICAM	NICAM
R820	030140618121	RES.CAR.FILM 180R 1/6W %5	NICAM	NICAM
R821	030140622221	RES.CAR.FILM 2.2K 1/6W %5	NICAM	NICAM
R822	030140647311	RES.CAR.FILM 47K 1/6W %5	NICAM	NICAM
R823	030140647111	RES.CAR.FILM 470R 1/6W %5	NICAM	NICAM
R830	030140622901	RES.CAR.FILM 2.2R 1/6W %5 NON-FLAMABLE	NICAM	NICAM
X800	049030000081	CRYSTAL 8.192MHZ	NICAM	NICAM

POS.	NO	DESCRIPTION	BOARD	FUNCTION
F800	037730007841	FILTER SAW 38.9MHZ(G9251M)	NICAM	NICAM BG
F800	037730007811	FILTER SAW 39.5MHZ(OFWJ9250M)	NICAM	NICAM I
R338	030140610411	RES.CAR.FILM 100K 1/6W %5	MAIN	NICAM L
C985	040040041021	CAP.CER. 1N 50V %10 B	NICAM	NICAM L
C830	040030043921	CAP.CER. 390P 50V %10 SL	NICAM	NICAM-I-BG
C835	040030043901	CAP.CER. 39P 50V %5 CH	NICAM	NICAM-I-BG
C837	040070031031	CAP.CER. 10N 50V %20	NICAM	NICAM-I-BG
C838	042416502261	CAP. ELECT. 22M 50V %20 RS	NICAM	NICAM-I-BG
C839	042412522011	CAP. ELECT. 2.2M 25V %20	NICAM	NICAM-I-BG
C840	042446164751	CAP. ELECT. 4.7M 16V %20	NICAM	NICAM-I-BG
C841	042446161061	CAP. ELECT. 10M 16V %20	NICAM	NICAM-I-BG
I800	045000000991	IC TDA3845	NICAM	NICAM-I-BG
L900	608280001881	COIL TOKO 38.9MHZ (2099)	NICAM	NICAM-I-BG
R807	030140622011	RES.CAR.FILM 22R 1/6W %5 NON-FLAMABLE	NICAM	NICAM-I-BG
C470	042446164751	CAP. ELECT. 4.7M 16V %20	MAIN	NTSC
Q457	046246022281	TRS.BC547B	MAIN	NTSC
R455	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	NTSC
R517	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	NTSC
R518	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	NTSC
R524	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	NTSC
X301	049030000511	CRYSTAL 3.579 MHZ	MAIN	NTSC 3,58
C330	040032041801	CAP.CER. 18P 50V %5 CH	MAIN	NTSC 3.58
	075100210020	CONN.2P MALE PT/ECOECO	ON-OFF	ON-OFF
	081000000031	ON-OFF SWITCH GDE SEALED S40(310.04.747.1)	ON-OFF	ON-OFF
S405	075030311021	CONN.3P MALE SM1	MAIN	OPTIONAL
I101	045190083771	IC TDA8361A	MAIN	PAL
F301	037720007831	FILTER SER. 6.0MHZ SFE 6.0MB	MAIN	PAL I
F303	037720007821	FILTER TRAP 6MHZ TPS 6.0MB	MAIN	PAL I
F305	037790007871	FILTER SAW OFWJ-1952M	MAIN	PAL I
I101	045000001441	IC TDA8362A	MAIN	PAL/SECAM
R347	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	PAL/SECAM
SC01	075040210050	SCART SOCKET	MAIN	S.SCART
Q473	046246022281	TRS.BC547B	MAIN	SAA5291
Q474	046246022281	TRS.BC547B	MAIN	SAA5291
R434	030140656211	RES.CAR.FILM 5.6K 1/6W %5	MAIN	SAA5291
R435	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	SAA5291
R436	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	SAA5291
R437	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	SAA5291
R438	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	SAA5291
C437	042447164761	CAP. ELECT. 47M 16V %20	MAIN	SAA5291
D451	048210411001	DIODE 1N4148 AX.	MAIN	SAA5291
C321	620013081041	CAP. M.K.T.100N 63V %5	MAIN	SCART
C322	620013081041	CAP. M.K.T.100N 63V %5	MAIN	SCART
C323	620013081041	CAP. M.K.T.100N 63V %5	MAIN	SCART
C347	040040041011	CAP.CER. 100P 50V %10 SL	MAIN	SCART
Q751	046246022281	TRS.BC547B	MAIN	SCART
Q752	046246022281	TRS.BC547B	MAIN	SCART
Q755	046246022281	TRS.BC547B	MAIN	SCART
Q756	046246022281	TRS.BC547B	MAIN	SCART
R316	030140615121	RES.CAR.FILM 150R 1/6W %5	MAIN	SCART
R321	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	SCART
R329	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	SCART
R751	030140622101	RES.CAR.FILM 220R 1/6W %5	MAIN	SCART
R752	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	SCART
R753	030140647011	RES.CAR.FILM 47R 1/6W %5	MAIN	SCART
R754	030140615121	RES.CAR.FILM 150R 1/6W %5	MAIN	SCART
R755	030140675011	RES.CAR.FILM 75R 1/6W %5	MAIN	SCART
R756	030140675011	RES.CAR.FILM 75R 1/6W %5	MAIN	SCART
R757	030140675011	RES.CAR.FILM 75R 1/6W %5	MAIN	SCART
R758	030140675011	RES.CAR.FILM 75R 1/6W %5	MAIN	SCART
R759	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	SCART
R762	030140615211	RES.CAR.FILM 1.5K 1/6W %5	MAIN	SCART

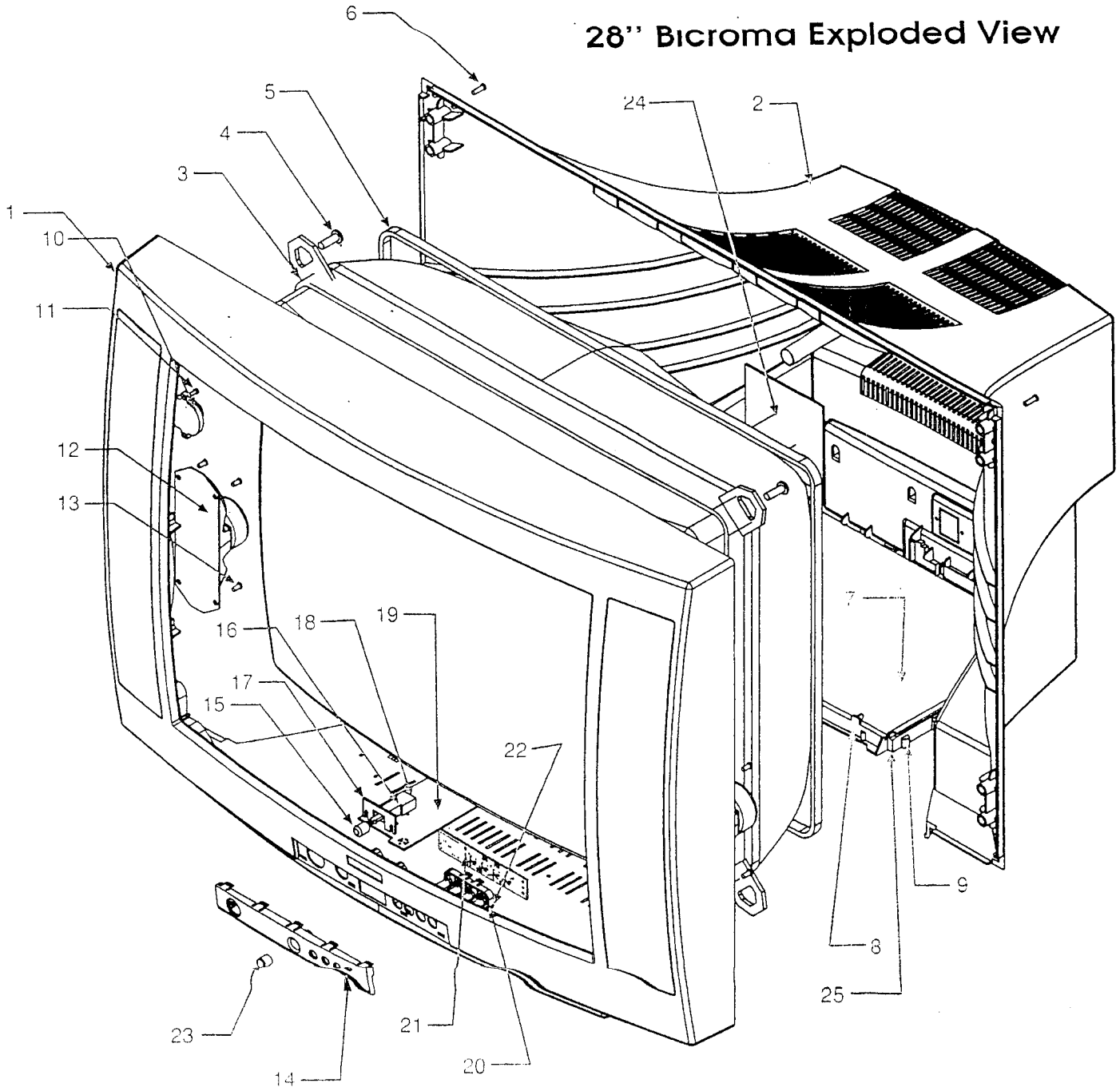
POS.	NO	DESCRIPTION	BOARD	FUNCTION
R763	030140610311	RES.CAR.FILM 10K 1/6W %5	MAIN	SCART
R774	030140647111	RES.CAR.FILM 470R 1/6W %5	MAIN	SCART
R776	030140647111	RES.CAR.FILM 470R 1/6W %5	MAIN	SCART
R778	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	SCART
R779	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	SCART
R780	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	SCART
R781	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	SCART
R782	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	SCART
R783	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	SCART
C751	040040043911	CAP.CER. 390P 25V %10	MAIN	SCART / MONO
C752	040030043921	CAP.CER. 390P 50V %10 SL	MAIN	SCART / MONO
C753	040070041021	CAP.CER. 1N 50V %80-20 F	MAIN	SCART / MONO
C754	040070041021	CAP.CER. 1N 50V %80-20 F	MAIN	SCART / MONO
C755	621004002241	CAP. M.K.T.220N 50V %10	MAIN	SCART / MONO
Q753	046246022281	TRS.BC547B	MAIN	SCART / MONO
Q754	046246022281	TRS.BC547B	MAIN	SCART / MONO
R765	030140612311	RES.CAR.FILM 12K 1/6W %5	MAIN	SCART / MONO
R766	030140612311	RES.CAR.FILM 12K 1/6W %5	MAIN	SCART / MONO
R767	030140612311	RES.CAR.FILM 12K 1/6W %5	MAIN	SCART / MONO
R768	030140618201	RES.CAR.FILM 1.8K 1/6W %5	MAIN	SCART / MONO
R769	030140622101	RES.CAR.FILM 220R 1/6W %5	MAIN	SCART / MONO
R770	030140622221	RES.CAR.FILM 2.2K 1/6W %5	MAIN	SCART / MONO
R771	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	SCART / MONO
R772	030140668411	RES.CAR.FILM 680K 1/6W %5	MAIN	SCART / MONO
R773	030140639411	RES.CAR.FILM 390K 1/6W %5	MAIN	SCART / MONO
C751	040040043331	CAP.CER. 330P 25V %10	MAIN	SCART / STEREO
C752	040040043331	CAP.CER. 330P 25V %10	MAIN	SCART / STEREO
C753	040040044721	CAP.CER. 4.7N 50V %10 B	MAIN	SCART / STEREO
C754	040040044721	CAP.CER. 4.7N 50V %10 B	MAIN	SCART / STEREO
R765	030140682211	RES.CAR.FILM 8.2K 1/6W %5	MAIN	SCART / STEREO
R766	030140682211	RES.CAR.FILM 8.2K 1/6W %5	MAIN	SCART / STEREO
C251	042446161061	CAP. ELECT. 10M 16V %20	MAIN	SECAM
C252	040070021031	CAP.CER. 100N 25V %80-20 F	MAIN	SECAM
C253	620013081041	CAP. M.K.T.100N 63V %5	MAIN	SECAM
C254	620004072241	CAP. M.K.T.220N 63V %10 5MM.	MAIN	SECAM
I251	045000000731	IC TDA8395	MAIN	SECAM
R251	030020622921	RES.CAR.FILM 2.2R 1/4W %5 NON-FLAMABLE	MAIN	SECAM
C275	620013081041	CAP. M.K.T.100N 63V %5	MAIN	SECAM L
C302	040034042711	CAP.CER. 270P 50V %5 CH	MAIN	SECAM L
C303	040040024701	CAP.CER. 47P 25V %10	MAIN	SECAM L
C304	620004001041	CAP. M.K.T.100N 50V %10	MAIN	SECAM L
D256	048210411001	DIODE 1N4148 AX.	MAIN	SECAM L
D300	048210411001	DIODE 1N4148 AX.	MAIN	SECAM L
F304	037730007081	FILTER SER.TPS 6.5MB	MAIN	SECAM L
F305	037730007901	FILTER SAW K-2955M (38.9MHZ)	MAIN	SECAM L
Q278	046246022281	TRS.BC547B	MAIN	SECAM L
Q279	046246022281	TRS.BC547B	MAIN	SECAM L
Q303	046246022281	TRS.BC547B	MAIN	SECAM L
Q304	046246022281	TRS.BC547B	MAIN	SECAM L
R287	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	SECAM L
R288	030140647311	RES.CAR.FILM 47K 1/6W %5	MAIN	SECAM L
R292	030140668201	RES.CAR.FILM 6.8K 1/6W %5	MAIN	SECAM L
R302	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	SECAM L
R319	030140633201	RES.CAR.FILM 3.3K 1/6W %5	MAIN	SECAM L
R331	030140647311	RES.CAR.FILM 47K 1/6W %5	MAIN	SECAM L
R336	030140675201	RES.CAR.FILM 7.5K 1/6W %5	MAIN	SECAM L
R337	030140668201	RES.CAR.FILM 6.8K 1/6W %5	MAIN	SECAM L
R338	030140622311	RES.CAR.FILM 22K 1/6W %5	MAIN	SECAM L
R344	030140622221	RES.CAR.FILM 2.2K 1/6W %5	MAIN	SECAM L
R345	030140647211	RES.CAR.FILM 4.7K 1/6W %5	MAIN	SECAM L
R346	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	SECAM L
R483	030140610201	RES.CAR.FILM 1K 1/6W %5	MAIN	SECAM L

28" Bicroma Exploded View



1- 905112280030	28"BICROMA CABINET
2- 905110028020	IC
905110280010	SM1 BACKCOVER
3- 28" PICTURE TUBE	
4- 015611232070	SCREW CRT Ø 7X30
5- 608580004070	DEGAUS COIL
6- 015541819390	SCREW PYSB Ø 3.9X12
7- MAIN CHASES	
8- 905110002120	STOPER HQLDER LEFT
905110002110	STOPER HQLDER RIGHT
9- 905110002240	PCB HOLDER LEFT
905110002250	PCB HOLDER RIGHT
10- 610206610241	TWEETER
11- 015511210290	TWEETER SCREW Ø 2.9X9.5
12- 610308128001	SPEAKER
13- 015511210390	SPEAKER SCREW
14- 905113007160	WINDQW
15- 905112000030	ON/OFF BUTTON
16- 001000000231	ON/OFF SWITCH
17- 995113007040	ON/OFF HOLDER
18- 015511210290	SCREW Ø 2.9X9.5
19- 614097000150	ON/OFF PCB
20- 905118142180	MULTIBUTTON
21- 614097000160	MULTIBUTTON PCB
22- 015511210290	SCREW Ø 2.9X9.5
23- 005210127020	H.PHONE COVER
24- CRT PCB	
25- 015511210290	PCB HOLDER SCREW

28" Bicroma Exploded View



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2- 905110028020	IC
905110280010	SM1 BACKCOVER
3- 28" PICTURE TUBE	
4- 015611232070	SCREW CRT Ø 7X30
5- 608580004070	DEGAUS COIL
6- 015541819390	SCREW PYSB Ø 3.9X12
7- MAIN CHASES	
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905110002110	STOPER HQLDER RIGHT
9- 905110002240	PCB HOLDER LEFT
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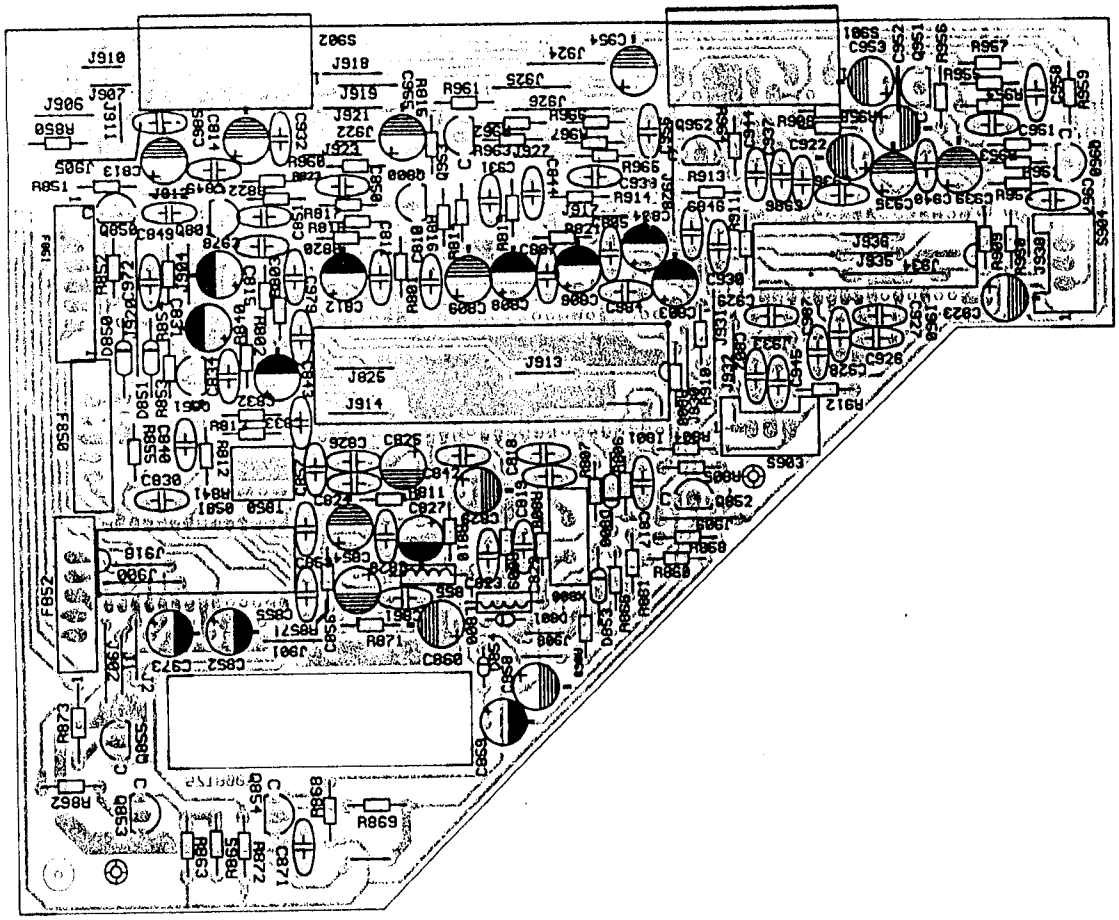
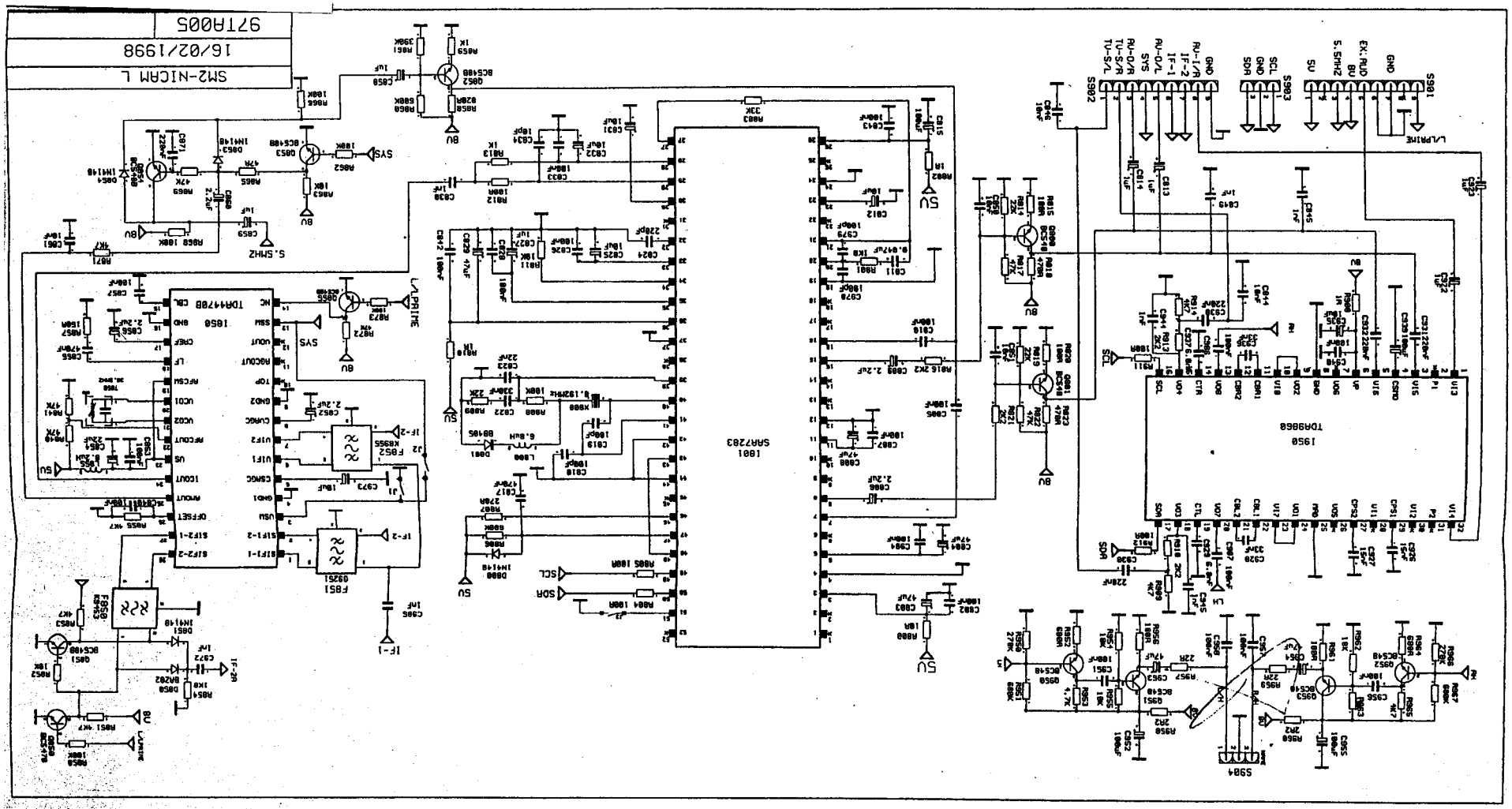
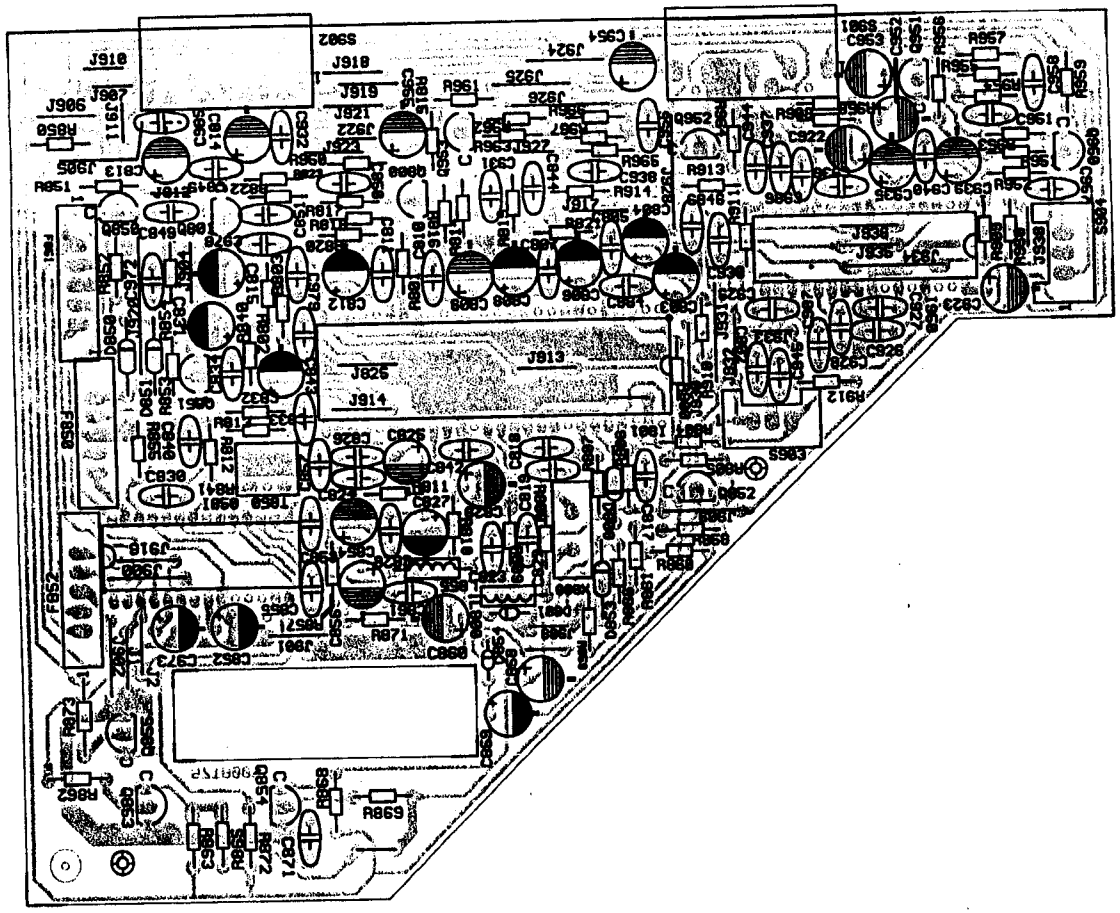
13- 015511210390	SPEAKER SCREW
14- 905113007160	WINDQW
15- 905112000030	ON/OFF BUTTON
16- 001000000231	ON/OFF SWITCH
17- 995113007040	ON/OFF HOLDER
18- 015511210290	SCREW Ø 2.9X9.5
19- 614097000150	ON/OFF PCB
20- 905118142180	MULTIBUTTON
21- 614097000160	MULTIBUTTON PCB
22- 015511210290	SCREW Ø 2.9X9.5
23- 005210127020	H.PHONE COVER
24- CRT PCB	
25- 015511210290	PCB HOLDER SCREW



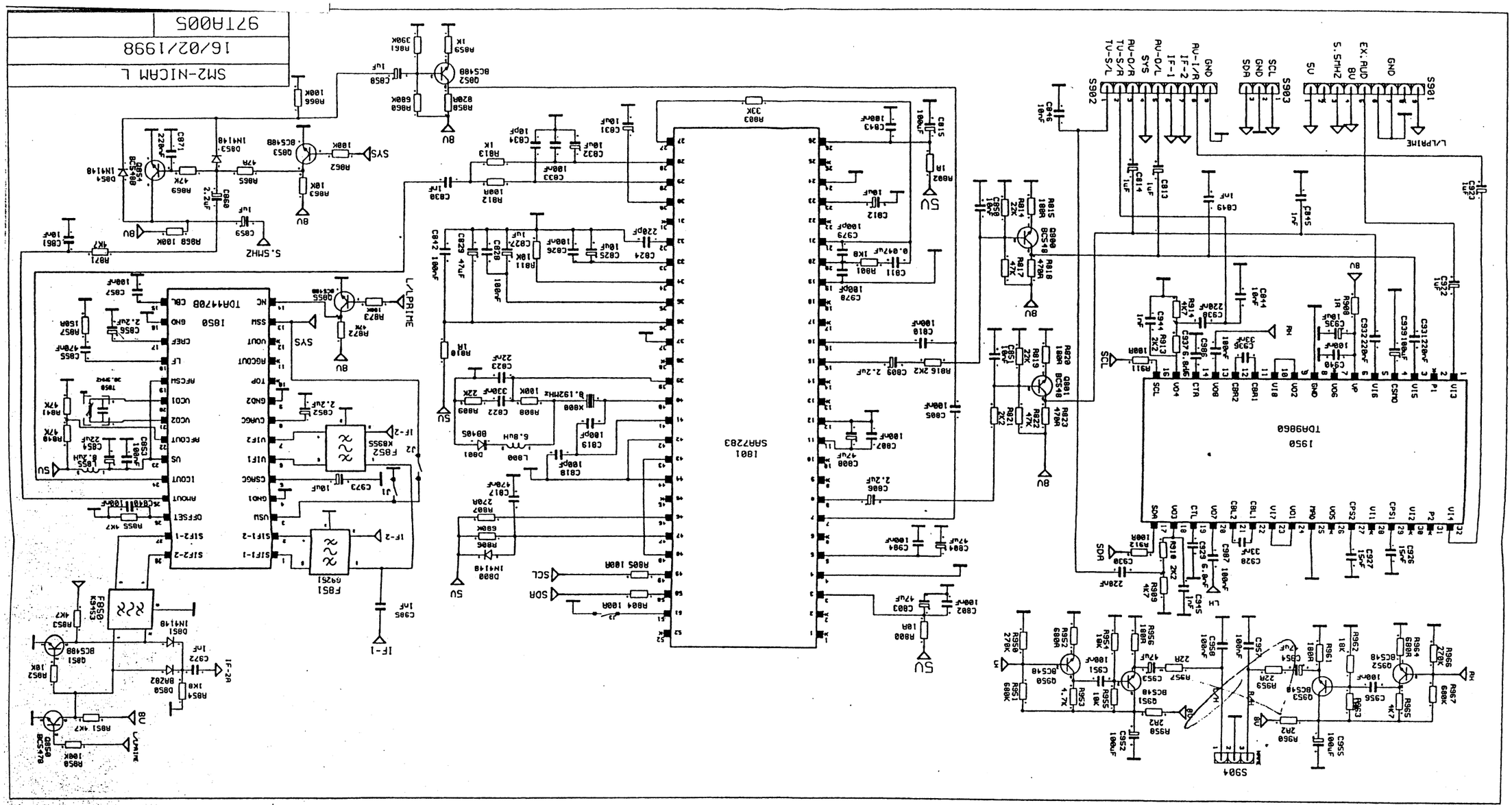
NICAM L BOARD LAYOUT



NICAM L BOARD CIRCUIT DIAGRAM



NICAM L BOARD LAYOUT



NICAM L BOARD CIRCUIT DIAGRAM

B-Y OUT
R-Y OUT
R-Y IN
B-Y IN

DELAY LINE
VP.DIG
D.GND
T.IN
B.IN
NC
T.OUT
TIN
R242 1K

TDA2595
FR.REF
TEST
SUP.
NC
NC
GND
CL.RE
PLL.REF
SECAM
R251 2.2R
C252 100nF
C251 10uF
C253 0.1UF
C254 0.22uF
8V
C248 100uF

J103
AV

S407
TV-S/R
TV-S/L

S103
5V
12V
5.5M/AV-SW
8V
EX.AUD
J101
J102
INTVID
L/L

NAME
V2
V1
E/W
HEATER
26V
ABL
GND
S500

S104
TV-S/L
TV-S/R
AV-OR
SYS
AV-OL
IF1
IF2
AV-IR
J105
J104
J106
J108
B/G-SND
SW-SND
IF1
IF2

MONO-SECAM-L/L'-MODULE
L/L
IF2
SYS
B/G-SND
EX.AUD
8V
5V
GND
.E.AUD
SW-SND
AV
S201

V.VID
5V
AV-I/L
AV-I/R
J704
C766 100nF
C759 100nF
J702
AV-O/R
R780 22K
Q755 BC547B
R779 22K
R778 1K
R785 1R
I701
HEF4053
VCC Y X X1 X0 A B C
Y1 Y0 Z1 Z Z0 ENABLE VEE GND
R784 47K
AV2
R783 22K
Q756 BC547B
R782 22K
AV-O/L
R781 1K
TV_VID
R789 220R
8V
Q757 BC547B
R795 1K
R792 1K
C763 1N
R767 47H
R786 1K
J701
R793 1K
C762 1N
R775 470R
R791 1K
SC2
C764 1N
R777 470R
R789 75R
C765 1NF
R152 10K
R153 6K8
8V

L576 40uH
R605 1K/3W
L570 1MH
C592 680nF
C596 10nF
C597 22nF
D578 BYV95C
C601 680PF
140V 200V
D579 BYV95C
C602 10uF
C599 2N2
C598 1nF
C520 470NF
D583 BYD33D
C600 1uF/400V
R618 15K
S580 HOR.DEFL. YOKE
[HORIZ.]
HORZ
EHT
FOCUS
G2
GND
ABL
H.SYNC.P
HEATER
VER.
GND
T602 NAME
EHT
SCREEN
HEATER
R617 4K7
C605 100nF
R612 2K7
D580 7.5V
C608 220pF
C610 47NF
R613 0.47R
26V
R614 0R22
C603 1000PF
D584 BYV26C
D587
C581 470uF
C580 22NF
+K
R615 0.22R
26V

AV-OR

AV-OL

AV-IR

EX.AUD

TV_VID
AV.VID
B/G-SND
SW-SND
AV-I/R
AV-O/L
AV-O/R
E.AUD
AV-I/L
8V
5V
+ 145V +B
+D 33V
+B 8V
+A 12V
+F STDBY
+C 5V
30V
PTC1 PTH451A
S106 DEGAUSS
S102
TR01 2x74MH
TR2
TDA4605-3
I001
I002 L7808
I003 LM317
I004 L7805
Q458 BC547B
Q459 BC558
Q752 BC547B
Q751 BC547B
Q753 BC547B
Q754 BC547B
Q123 BC547B
Q101 BUZ90
Q580 2SC1573A
SC1
S.SW
R520 27K
R456 47K
R500 33R
R492 330R
R493 330R
R494 330R
R329 4.7K
R798 12K
R765 12K
R767 12K
R772 680K
R770 2.2K
R769 220R
R773 390K
R771 1K
R768 1.5K
R521 22K
R764 JUMPER
R763 10K
R762 1K5
R761 JUMPER
R760 JUMPER
R759 1K
R753 47R
R754 220R
R794 VAL
R758 75R
R757 75R
R756 75R
R755 75R
R754 150R
R752 1K
R776 470R
R774 470R
R101 2.2R 5W
R103 47K
R102 68K
R104 68K
R108 270K
R109 680K
R107 68R
R112 5.1R
R114 10K
R106 6K8
R115 4R7/1/2W
R128 0.22R
R122 0.47R
R121 0.47R
R120 0.47R
R124 12K
R130 47K
R134 0R33
R131 390R
R132 3K3
R127 10K
R126 4.7K
R136 3R3/5W
R611 3R9
R601 10K
R602 220R
R608 10K
R609 2K
R610 1R
R623 1R
C754 4700PF
C753 4700PF
C751 330PF
C752 330PF
C755 0.22uF
C104 2200PF
C103 2200PF
C105 100uF
C102 0.1uF
C101 0.47uF
C106 33NF
C107 1000PF
C115 100PF
C111 47R
C114 680PF
C110 3n3F
C116 220PF
C109 1uF
C112 47uF
C113 0.22uF
C144 470PF
C124 470PF
C122 1000pF
C121 1000uF
C120 1000PF
C123 470uF
C150 100nF
C141 47uF
C142 100nF
C145 47uF
C137 100uF
C136 100NF
C139 100NF
C140 220uF
C134 10NF
C138 22uF
C135 47uF
C151 220uF
C152 100NF
C322 0.1uF
C323 0.1uF
C344 4.7uF
C509 2200PF
C593 2.2nF
C594 470PF
C511 470PF
D456 1N4148
D455 1N4148
D454 1N4148
D305 1N4148
D585 1N4148
D584 1N4148
D125 BYV95C
D124 27K36
D122 BYV95C
D121 BYV95C
D120 BYV95C
D104 BYD33D
D105 BY0330
D102 BY0330
D101 1.2A/600V
L751 8.2UHJ
L752 8.2UHJ
L121 150UHK
L600 HOR.DRV
J755
J753
J752
J751
S301
BCL
GND
BLUE
GREEN
RED
R.IN
G.IN
B.IN
CONT.
SAT.
TV_V
E/W
HOR.DRV
HOR.
AV-OR
AV-OL
AV-IR
EX.AUD

TDA2616

OUT1 -VP OUT2 +VP INV1,2 -INV2

TV-S/R
TV-S/L
S406

R404 1K
J400
TV-S/R
C435 10nF
C434 100UF/16V
C432 1000uF/25V
R433 0R47
C431 22nF
C436 100nF
C430 1000uF/25V
C433 1000uF/35V
30V
S404
S403

R724 470R
P581 1K
C599 4n7
S575
R715 1K
R717 18K
R722 12K
I600
K-IN NINV-IN SAM-IN INV-IN CUR-REF +VS GND OUT
TDA8145
D575 1N4148
R713 4K7
R714 18K
C597 33nF
C596 10nF
OUT
26V
HT
R710 33R
C600 47uF
C598 100nF
R711 3R3
C595 1nF
P580 100K
D574 30V

J302
J304
TV-S/L
I576
TDA3654
IN1 GND SW.IN GND OUT SUPP1 GUARD FLYB. SUPP2
VERT.SUP (H.DRV)
C343 22NF
C342 2.2uF
C341 10uF
8V
R343 1K
R342 5.6K
C340 220NF
U AGC
P301 10K
C337 2.2uF
C338 100NF
C339 22NF
R340 3K3
33V
K2962
F305
C335 0.1uF
R576 4.7K
R577 4.7K
C578 470pF
C579 47uF
D576 1N4007
R585 150R
C587 1000uF
5V
D592 1N4148
C586 1nF
C577 1nF
C576 10nF
R578 220R
S581 (VERT.)
C584 100NF
R589 1R
V1
V2
V. LINEARITY
V.DEFL.YOKE
VERT.
R546 47K
C585 100NF
R588 4K7
VERT.PULSE
R581 56K
R580 180R
C582 1uF
R572 15K
C583 2200uF
R591 150R
Q500 BC547B
R562 18K
16/9
V.SHIFT
R590 560R1/2W
P579 5K
R584 1K
R583 100R
R586 560R
V.AMP.
R339 12K
C334 2N2
C332 4n7F
C333 1uF
8V
HOR.DRV
R335 470K
P300 10K
H.SHIFT
C331 10NF
R334 4.7R
R336 7.5K
R337 6.8K
R338 22K
Q303 BC547B
8V
AV
C327 18PF
C328 1uF
C329 10NF
R333 10K
X301 3.58MHz
C330 18PF
C325 4n7F
R332 100K
C326 100NF
V.SYNC
R530 22K
B-Y OUT
R-Y OUT
R-Y IN

IR. MODULE

D600 LED
R600 1K
IR02
TFMS1360
GND IR VCC
S800
C801 4n7F
C800 4.7uF
RMOT
+5V

200V
HEATER
S603

R241 2.2R
5V
B-Y IN
R-Y IN

C246 1NF
C245 1NF
C244 100NF
C243 100NF
C255 100NF
TDA4665
DELAY LINE
I102
-(B-Y) IN NC -(B-Y) IN REF -(R-Y) -(R-Y) A.GND VP.AN
VP.DIG D.GND T.IN S.IN NC T.OUT TIN

I251
TDA8395
VD SNDC. NC NC NC NC -(B-Y) -(R-Y)
FR.REF TEST SUP. NC NC GND CL.REF PLL.REF
SECAM

TU01
WSP
I426 TDA2616
I301
CTV811S
I101
TDA8362A
(PAL/SECAM)
I302
PCF8594C
F302
SFE6.5
F303
TPS6.5MB
F304
6.5MHZ
F305
K2962
S303
S304
S403
S404
S406
S581
[VERT.]
TU
U AGC
TUN
V.DEFL.YOKE
VERT.PULSE
HOR.DRV
H.SHIFT
B-Y OUT
R-Y OUT
R-Y IN
SCL
SDA
SYS
IF1
IF2
AGC
AV
TV_VID
INT.VID
EX.AUD
B/G-SND
16/9
SWEEP
5V
8V
12V
30V
33V
VTUNE
VOL-L
VOL-R
SAT
CON
HUE
BRI
SHARP
AFC
AV1/STAT
AV2-NAV1
INT-NEXT
XTAL-OUT
BANDO
DPL
KYB0
KYB1
KYB2
ON/OFF
LED-N
VSSA
CVBSO
BE-SYSTEN
N-TRAP
SDA
SCL
FE-SYSTEN
RCSN
FEATURE
IDENT
VDDN
RESET
XTAL-OUT
XTAL-IN
OSCGND
VDDT
VDDA
VSYNC
HSYNC
VDS
R
G
B
RGBREF
TURBOBASS
A.DEMP
REF.I
REF.C.
IDEN
S.IFIN
EX.A.IN
VOUT
DEC.
AFCOUT
SUP.
GND2
DEC
INCVBSIN
B.C.IN
EXCVBSIN
CHRIN/SS
BAG
B.OUT
G.OUT
R.OUT
INS.
R.IN
G.IN
B.IN
-INV1
MUTE
1/2VP/GND
OUT1
-VP
OUT2
+VP
INV1,2
-INV2
TV-S/R
TV-S/L
B.DEC
S.DEC
S.OUT
TUN.T-O
AGC
TUN.AGC
IF.IN.
IF.IN
VER.R.G.
VER.F.B.
GND
DICON.
D2CON.
FLYIN/S
H.DRV
S.SUP.
XTAL4.43
XTAL3.58
B.PH.DET
SUBOUT.S
B-YOUT
R-YOUT
R-YIN
BCL
GND
BLUE

I301

CTV811S

I101

TDA8362A

(PAL/SECAM)